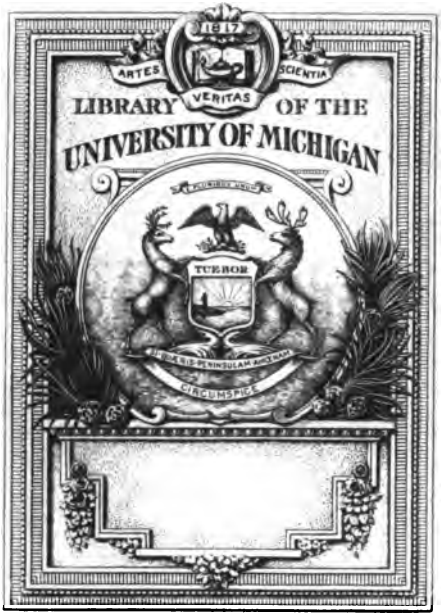

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM

No. 55

A CONTRIBUTION TO THE OCEANOGRAPHY OF THE PACIFIC

BY

JAMES M. FLINT

MEDICAL DIRECTOR, U. S. NAVY
CURATOR, DIVISION OF MEDICINE, U. S. NATIONAL MUSEUM

WASHINGTON
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S. P. LANGLEY,
Secretary of the Smithsonian Institution.

WASHINGTON, U. S. A., *December 1, 1905.*

A CONTRIBUTION TO THE OCEANOGRAPHY OF THE PACIFIC

COMPILED FROM DATA COLLECTED BY THE UNITED STATES STEAMER *NERO* WHILE ENGAGED IN THE SURVEY OF A ROUTE FOR A TRANS-PACIFIC CABLE

BY

JAMES M. FLINT

Medical Director, U. S. Navy; Curator, Division of Medicine, U. S. National Museum

Washington
Government Printing Office
1905

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A CONTRIBUTION TO THE OCEANOGRAPHY OF THE PACIFIC

By JAMES M. FLINT,

Medical Director, U. S. Navy; Curator, Division of Medicine.

INTRODUCTION.

In the early part of the year 1899 the U. S. S. *Nero*, a steam collier of 4,925 tons displacement, which had been purchased for use during the Spanish-American war, was fitted out by the Navy Department, equipped with the necessary apparatus, and dispatched from San Francisco under the command of Commander Charles Belknap, U. S. Navy, with instructions to survey a route for a telegraph cable between the United States, the Philippine Islands, and Japan.

On account of the illness of Commander Belknap, he was relieved from command on the arrival of the ship at Manila by Lieut. Commander H. M. Hodges, U. S. Navy, who remained in charge of the survey until its completion.

Several previous surveys having established a satisfactory route between the coast of California and the Sandwich Islands, the actual work of the *Nero* began at Honolulu, from which port the ship sailed on the 6th day of May, 1899.

The following table of dates, distances, and number of soundings furnishes an abstract of the cruise:

Locality.	Date.	Distance run.	Number of soundings.
	1899.	*Knots.*	
Left San Francisco	Apr. 22		
Arrived Honolulu	May 2		None.
Left Honolulu	May 6		
Arrived Midway Island	May 22	1,184.5	195
Left Midway Island	May 24		
Arrived Guam	July 5	3,520.35	467
Left Guam	July 7		
Arrived Dingala Bay, Luzon	Aug. 1	1,400.15	191

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Locality.	Date.	Distance run.	Number of soundings.
	1899.	*Knots.*	
Left Dingala Bay	Aug. 1		
Arrived Manila	Aug. 4		None.
Left Manila	Aug. 15		
Arrived Dingala Bay	Aug. 18		None.
Left Dingala Bay	...do		
Arrived Guam	Sept. 7	2,753	136
Left Guam	Sept. 9		
Arrived Yokohama	Sept. 24	1,427.70	248
Left Yokohama	Oct. 10		
Arrived Guam	Nov. 2	2,941.50	231
Left Guam	Nov. 12		
	1900.		
Arrived Midway Island	Jan. 3	5,725.30	402
Left Midway Island	...do		
Arrived Honolulu	Jan. 29	2,567.15	204
Left Honolulu	...do		
Arrived San Francisco	Feb. 11		None.
Total		21,519.65	2,074

From the above table it appears that the distance sailed while on actual survey work was 21,519 geographical miles and the number of soundings 2,074, or an average of one sounding at every ten miles of distance run. Measuring the direct course of the survey, 6,144 knots, there are records of soundings averaging one every three miles of the route.

PLAN OF SURVEY.

The instructions regarding the survey were, in brief, to follow as nearly direct lines as practicable from Honolulu to Midway Island, thence to Guam, thence to Luzon, and also from Guam to Japan. Soundings were to be taken on the outward voyage at intervals of 10 and 2 miles alternately; temperatures of the air, surface and bottom of the sea to be recorded; currents noted; samples of bottom material brought up in a sounding cup to be preserved, etc. The return course was planned to cross the primary route zigzag at angles of 45°, the sides of the angle to be 20 miles in length; soundings to be taken at the apices of the angles. This plan was effectively carried out, modified somewhat in detail by circumstances, especially as regards intervals between soundings and detours from the main line in order to develop marked irregularities of the contour of the ocean bed. In this manner an examination was made of a belt of ocean about 14 miles wide and over 6,000 miles in length, unequaled in thoroughness, so far at least as soundings are concerned, by any survey hitherto made of an ocean tract.

TRACK.

It would be unnecessary for the purpose of this study to attempt to present in detail the exact courses followed by the vessel, which were at times quite erratic, in the effort to find the most feasible location for the cable. It is to be understood, therefore, that the accompanying track charts do not represent the exact courses of the ship nor the line determined upon for the cable or followed in the laying of it. The stations charted, however, are supposed to be accurately located. Before preparing the charts certain stations on the outward voyage were selected for careful examination of bottom material. The considerations governing the selection were chiefly the depth, the macroscopic appearances of the bottom specimens, and the distances. These stations were afterwards plotted and connected by a continuous line. In a few instances outlying stations of especial interest have been indicated on the charts, and a serial number and depth given for each. On the first or diagrammatic chart the station numbers included within each five degrees of longitude or latitude are given for both the outward and homeward voyages. By means of this index it is easy to locate approximately any station mentioned in the record.

DEPTHS.

The graphic representation of the contour of the ocean bed along the course of this survey is less simple and satisfactory than usual, because of the breadth of track explored and the large number of soundings recorded. It should be noted, in examining the contour charts appended, that the lines are drawn from the localities indicated on the track charts as stations selected for special examination of bottom material, and one of the principal determining factors in the selection was that of depth. Therefore, the contour charts may be said to represent the extremes of elevation and depression along the main line of the outward voyage only, without taking into account intermediate or outlying irregularities of surface. The omitted stations can be easily supplied from the record if greater detail is desired.

Leaving the island of Oahu of the Hawaiian group, the depth increases quite rapidly until it reaches about 2,500 fathoms. This depth is reached less than 30 miles due north of the island. From this point nearly to Midway Island there is a comparatively level plain, broken only by two or three outlying peaks from the mountain range whose highest summits show themselves as small islands or reefs a little to the westward of the line of survey. One of these peaks appears at station 93, where there is a sharp rise to 1,463 fathoms, which, however, as rapidly falls away to the normal level a few miles to the northward. A smaller projecting spur is indicated at station 106, 2,002 fathoms. Another sudden rise to 1,726 fathoms

appears at station 124, followed by depressions to more than 2,600 fathoms a few miles away, both to the westward and northward. With these exceptions the range of variation is practically between 2,500 and 3,000 fathoms for the whole distance until the immediate vicinity of the Midway Islands is reached.

About 30 miles to the southward and westward of Midway Island a very bold peak was discovered rising abruptly from the ocean floor, 2,000 fathoms below the sea level, to a height only 82 fathoms below the surface.

Passing from the vicinity of Midway Islands a nearly level plain is found, extending about 1,000 miles to the westward, upon which the extremes of depth of water are 2,926 and 3,382 fathoms. About mid-distance between Guam and Midway Islands what is apparently a mountain range is encountered, extending over 3° of longitude, with varying depths from 3,000 to 720 fathoms. On the westward side of this mountain range another plain below the 3,000-fathom line extends a distance of about 300 miles. From the western limit of this plain until Guam is reached the contour is quite irregular. Extensive detours both north and south of the direct course developed a mountainous region, with peaks rising to 689 fathoms below the sea level, and valleys descending to a depth of more than 5,000 fathoms. Four soundings below the 5,000-fathom line were made, with the record of 5,070, 5,101, 5,160, and 5,269 fathoms. These were in the abyss now known as the "Nero Deep." The last-named sounding was numbered 1488, in latitude 12° 43′ 15″ north, longitude 145° 49′ east, about 75 miles east-southeast from the island of Guam, and is the deepest sounding ever recorded, being only 66 feet less than 6 statute miles.

From Guam to Luzon the ocean bed is for the most part gently undulating, at depths varying from 2,500 to 3,000 fathoms. About 120 miles west of Gaum (station 688) there appears a sharp elevation to 1,346 fathoms, which however soon subsides to the normal depth of about 2,700 fathoms. Again, about 600 miles from Guam (station 760) a rise to 1,560 fathoms is encountered. From the data at hand this latter would seem to be a peak rather than a mountain range, since soundings east, west, and south show speedy subsidence to nearly normal depths. At station 784 the depth reaches 3,547 fathoms, with several soundings in that vicinity below 3,000. Approaching Dingala Bay on the east coast of Luzon and about 120 miles distant (station 864) another peak appears with summit only 821 fathoms below sea level. In this instance also, soundings north, east, and west soon develop normal depths.

From Guam to Yokohama the route lies to the westward of the Ladrone Islands and to the eastward of the Bonin group. For a distance of 500 miles or more from Guam the soundings show a gently undulating plain at an average depth of about 2,100 fathoms. Between

latitude 21° 45′ and 22° 8′ north and longitude 143° 45′ and 143° 20′ east three sharp peaks arise along a line about 35 miles in length and northwesterly in direction. On the first, or most southerly, the sounding record is 483 fathoms; on the second, about 18 miles away, the record is 838 fathoms; and on the third, 20 miles farther to the northwest, 802 fathoms. There are valleys 1,000 fathoms deep between these peaks. The indications point to a continuous range of mountains connecting the Ladrone Islands with the Bonin group. After dropping down the eastern slope of the above-mentioned peaks, the depth increases by an easy gradient to 3,595 fathoms at station 1095, rising and falling gently until at station 1126 a sounding of 972 fathoms locates an outlying spur from the Bonin range. Still farther to the northward and westward, at station 1135, the bottom drops to 3,421 fathoms, followed by gentle slopes up to 1,500 and down to 2,900 fathoms, until the Gulf of Tokyo is reached.

GRADIENTS.

In computing the gradients from station to station serially on the outward voyage only, involving 1,100 soundings, sixty-nine localities only are found where the gradient exceeds 10 per cent. These higher grades are for short distances only, averaging less than 5 miles, and confined to a few regions, especially to the vicinity of Midway Islands, Guam, and the mountain range halfway between the above-mentioned islands. Of the sixty-nine localities showing a grade above 10 per cent, fifty have an incline between 10 and 20 per cent, eleven between 20 and 30 per cent, and six between 30 and 40 per cent. At the entrance to Port Tarafofo, on the east coast of Guam, two soundings one-fourth of a mile apart show a difference of depth of 123 fathoms, equivalent to a gradient of about 51 per cent. Also on the declivity of the peak southwest of Midway Islands, which rises to 82 fathoms beneath the surface of the water, there is a change of depth of 1,269 fathoms (7,614 feet) in a horizontal distance of 1.8 sea miles, a gradient of 70 per cent. With these few and localized exceptions the bed of the Pacific Ocean, as developed by this survey, though rising here and there near to the sea level, and again descending to depths of 5 or 6 statute miles, follows easy gradients. On the great plain to the westward of the Midway Islands, 1,000 miles in breadth, the average gradient is less than 1 per cent—in one instance only rising to 4.5 per cent, for a distance of 2 miles.

TEMPERATURES.

AIR AND SURFACE WATER.

The temperature of the air on board the ship, and of the water near the surface, was taken at nearly all the sounding stations. These stations numbered, on the average, about ten each day on the outward

voyage, and eight on the return voyage, distributed at nearly equal intervals over the twenty-four hours.

The following table presents the results of certain computations from the official records. (All temperatures are given in degrees Fahrenheit.)

Temperature of air and surface water.

Locality.	Date.	Number of observations.	Air.			Water.		
			High.	Low.	Average.	High.	Low.	Average.
			°	°	°	°	°	°
Hawaiian Islands to Midway.	May 6 to May 24, 1899.	187	81	66	73.3	78	67	73.2
Midway to Hawaiian Islands.	Jan. 3 to Jan. 29, 1900.	185	79	61	69.1	77	65	72
Midway to Guam ...	May 24 to July 6, 1899.	463	92	72	79.2	86	70	80.6
Guam to Midway ...	Nov. 12, 1899 to Jan. 1900.	405	87	63	77.5	85	66	80.6
Guam to Luzon	July 7 to Aug. 1, 1899.	191	90	75	82.6	89	82	84.3
Luzon to Guam	Aug. 19 to Sept. 9, 1899.	134	91	77	82.8	87	80	84.5
Guam to Yokohama.	Sept. 9 to Sept. 24, 1899	248	90	68	81.2	87	75	83.8
Yokohama to Guam.	Oct. 10 to Nov. 2, 1899.	228	91	67	79	86	70	81.9

It will be seen from the above table (1) that the average temperature of the air, in these regions uninfluenced by the proximity of other than small and scattered islands, varies little from that of the contiguous waters of the sea. (2) That in the region between the Hawaiian Islands and Guam the difference between summer and winter temperatures of both air and water is quite small. On the round trips between Guam and Luzon and Guam and Yokohama, each having occupied only about two months, there are not sufficient data for estimation of seasonal changes in these regions. In considering extremes of temperature, it should be remembered that Midway Islands and Yokohama are both in considerably higher latitudes than the Hawaiian Islands, Guam, and Luzon, and, other conditions being equal, the lowest temperatures would naturally be found in the higher latitudes.

Thus, the surface temperature in the vicinity of Oahu is about 75°.4, while in the vicinity of Midway it falls to about 71°. Leaving Midway with an average of 70°.4 at the first eleven stations, the surface temperature rises to an average of 84°.8 at the last thirty-one stations approaching Guam. From Guam until within 300 miles of Yokohama the surface water remains near 85°, falling to an average of 76°.7 at the last eighteen stations.

The diurnal variations of temperature were of course greater in the air than in the water near the surface. The normal range of variation was from 4° to 7° for the air, and 1° to 3° for the surface water. The

extreme range of air temperature for any one day was 14°, January 17, 1900. There is also one record of 13° August 30, 1899, four of 11°, and four of 10°. Averages are shown in the following table:

Average daily variations.

Locality.	Date.	Air.	Surface water.
Hawaiian Islands to Midway	May 6 to May 22	5.2	2.4
Midway to Hawaiian Islands	Jan. 3 to Jan. 29	4.7	1.9
Midway to Guam	May 24 to July 5	5.8	2.0
Guam to Midway	Nov. 12 to Jan. 3	3.4	1.1
Guam to Luzon	July 7 to Aug. 1	5.7	1.7
Luzon to Guam	Aug. 18 to Sept. 7	7.7	2.6
Guam to Yokohama	Sept. 9 to Sept. 24	5.3	2.1
Yokohama to Guam	Oct. 10 to Nov. 2	5.8	2.2

How much the recorded air temperatures may have been affected by local conditions, such as radiation from the heated deck at midday, or evaporation from a wet deck, it is impossible to estimate.

BOTTOM TEMPERATURES.

No serial temperatures were taken. Observations of bottom temperatures on both outward and homeward voyages to the number of 604 are reported. In drawing conclusions from the records of these observations, some allowance should be made for the difficulties attending the measurement of temperatures at great depth, because of the delicacy of the instruments, the enormous pressures to which they are subjected, the shocks to which they are liable, and the vibration tending to displace the index as the thermometer is drawn up. Professor Tate says:[a] "The circumstances under which thermometers are let down and drawn up again at sea are extremely unfavorable to accuracy of observation." In the column of remarks, on the *Nero* records, it is repeatedly noted that "Thermometer failed to work." So that where striking variations from normal temperatures, at given depths and in neighboring localities, appear on the record, the probabilities seem largely in favor of the assumption of instrumental, or possibly clerical, errors rather than of great eccentricities of temperature, unless there should appear to be something in the local conditions reasonably to account for the variation.

[a] Results of the Exploring Voyage of H. M. S. *Challenger*.

The following table presents an abstract of the records of bottom temperatures:

Depths.	Number of observations.	High.	Low.	Average.
		°	°	°
Less than 500 fathoms	1			43.7
500 to 600 fathoms	1			39.8
600 to 700 fathoms	3	40.5	38.3	39.4
700 to 800 fathoms	5	38.6	36	37.3
800 to 900 fathoms	7	41.1	36.7	38
900 to 1,000 fathoms	3	37	36	36.4
1,000 to 1,500 fathoms	42	38	35	35.46
1,500 to 2,000 fathoms	83	39	35	35.31
2,000 to 3,000 fathoms	[a] 266	36	34.2	35.17
3,000 to 4,000 fathoms	[b] 188	36.3	34	35.22
4,000 to 5,000 fathoms	3	35.6	35.4	35.50
5,070 and 5,101 fathoms	2	36	35.9	35.95

[a] 16 records thrown out. [b] 10 records thrown out.

The high temperature average, between 800 and 900 fathoms, is due to the exceptional record of 41°.1 at station 1225, in immediate proximity to the volcanic island of Oshima or Vries Island, at the entrance to the Gulf of Tokyo; also two records of 39° at stations 1569 and 1570, on the summit of a high peak or ridge about 450 miles to the eastward of the island of Guam. The average of the other four records is 36°.97.

In the series of observations at depths between 1,000 and 1,500 fathoms there is record of 38° at station 1678, and 37°.3 at the adjoining station 1677. These two stations are on one of the peaks of the mountain range in midocean between Midway and Guam. There are no other records of temperature above 37° at these depths.

Only two stations between the 1,500 and 2,000 fathom line record temperature above 37°, namely: Stations 1000, 39°.3 and 1009, 37°.3, about 60 and 120 miles, respectively, to the northward of Guam. There is probability of error in one or both of these observations.

In making up the average of temperatures between 2,000 and 3,000 fathoms, 16 of the 266 observations have been omitted from the calculations. In some of these cases "incorrect" is noted on the original record; in others, the probability of instrumental or clerical error is so much greater than the probability of existence of local conditions capable of producing such deviations from the normal range of temperature as to justify their exclusion. The omissions are stations 131 (44°), 138 (51°.7), 140 (44°.8), 232 (39°.4), 243 (38°.2), 477 (38°.8), 479 (44°.5), 719 (67°.6), 722 (67°), 723 (67°), 962 (37°), 1508 (33°), 1511 (33°), 1512 (34°), 1513 (34°), 1514 (34°). The last five of these rejected observations were taken by a thermometer concerning which it is noted: "Correction not known." This thermometer

being replaced by another, the temperatures are again recorded at the normal of 35° and above.

Of the 188 temperatures taken at depths from 3,000 to 4,000 fathoms, 10 have been excluded from the computation of averages, for the reasons given above. They are the following: Stations 239 (52°), 244 (38°), 251 (38°.9), 257 (60°), 312 (38°.4), 422 (37°.8), 489 (40°.2), 501 (37°.4), 790 (32°), 809 (22°.9).

Three temperature observations were made between 4,000 and 5,000 fathoms, and two at depths of 5,070 and 5,101 fathoms respectively, all in the abyss southward and eastward of Guam.

The obvious inference from the above computation is that the temperature of that part of the Pacific Ocean covered by this survey falls rather rapidly from the surface to about 600 fathoms, then very slowly to about 2,500 fathoms, where the normal temperature varies but slightly from 35° F. Below 2,500 fathoms there appears to be a slight rise of a fraction of a degree. But it is open to question if this apparent rise may not be due to the effect of the enormous pressure of three to five tons to the square inch, at these great depths, upon the instruments.

CHARACTER OF BOTTOM.

The character of the bottom indicated on the record by abbreviations, refers only to the gross appearances of the material recovered in the sounding cup, when fresh from the water. Translated into the terms of the usual scientific classification, the brown mud ("br. m.") of the record is generally the red clay of the oceanographer, or rarely volcanic mud from deep water. With few exceptions what is designated coral sand ("co. s.") is globigerina ooze. The rock (R. or r.) has, in every case examined, proved to be fragments of pumice or manganese-iron concretions; the black specks also are almost always particles of manganese iron. Except in the immediate vicinity of a shore, gravel (G. or gvl.) is, in this part of the ocean at least, coarse volcanic débris which has been distributed by wind or wave all over the sea, and has finally found its way to the bottom. The sand (S. or s.) so often noted consists of finer mineral particles from the same source as above-mentioned, except near the shores of islands.

Other abbreviations than those just given, used in the columns for character of bottom, refer to color, size, etc.—bk=black; br=brown; dk=dark; gy=gray; lt=light; rd=red; wh=white; y. or yl=yellow; crs=coarse; fn=fine; hrd=hard; rky=rocky.

DEPOSITS.

The accepted classification of marine deposits, by Dr. John Murray and Dr. A. F. Renard,[a] is as follows:

Marine deposits.

1. Deep-sea deposits beyond 100 fathoms.	Red clay.	Pelagic deposits formed in deep water removed from land.
	Radiolarian ooze.	
	Diatom ooze.	
	Globigerina ooze.	
	Pterapod ooze.	
	Blue mud.	Terrigenous deposits formed in deep and shallow water close to land masses.
	Red mud.	
	Green mud.	
	Volcanic mud.	
	Coral mud.	
2. Shallow-water deposits between low-water mark and 100 fathoms.	Sands, gravels, muds, etc.	
3. Littoral deposits between high and low water marks.	Sands, gravels, muds, etc.	

Only 22 soundings are recorded within the 100-fathom line, and from several of these no specimens have come to hand. Practically, therefore, only deep-sea deposits have to be considered in this report.

Red clay.—Of the above-mentioned classes of deposits by far the most extensive is red clay. This, as it appears in the specimens received, is a smooth, sticky mud, varying in color from light yellowish-brown (fawn color) to dark chocolate, these colors being somewhat modified in individual instances by exposure to light, and especially by drying. In composition it consists of (1) extremely fine, amorphous particles of clayey matter, mostly hydrated aluminum silicate and the débris of other minerals; (2) the remains of calcareous organisms (foraminifera, coccospheres, and rhabdospheres), this constituent, however, rapidly disappearing at depths of about 2,500 fathoms; (3) siliceous organic remains (sponge spicules, radiolarian skeletons, and the frustules of diatoms; (4) mineral fragments, mostly of volcanic origin, at least in this part of the ocean; and (5) certain products of local chemical reactions, especially nodules, coatings, and grains of manganese peroxide, crystals of phillipsite, and particles of palagonite. The proportions of these constituents vary greatly along the line and even from station to station. As has been stated, foraminifera disappear, for the most part, at depths below 2,500 fathoms; radiolaria are likely to be more numerous in the deeper waters; diatoms are nearly everywhere, but only occasionally in great numbers. Mineral fragments may be so minute in some specimens that they pass over almost

[a] Report on Deep Sea Deposits, based on specimens collected during the voyage of H. M. S. *Challenger*.

entirely in the fine washings, while in others they may be comparatively coarse. Volcanic glass is sometimes present in notable quantity. Manganese-iron nodules, and concretions upon other minerals, are almost universally present. They are the black specks ("bk. sp.") so frequently recorded on the official records, the larger ones being generally referred to as rock ("R.") Phillipsite is a freqent constituent. It is found as quite perfect crystals, single, twinned, or multiple, or more frequently as spherules made up of crystals arranged radially. The simpler forms are found in great numbers at station 331 (2,997 fathoms), and the spherules at station 495 (3,204 fathoms). Vertebrate remains, teeth of sharks and other fishes, and otoliths, have not been observed in this or other deposits, though carefully looked for.

This red clay deposit is indicated in 75 per cent of the soundings from which specimens were received (1,043 out of 1,394), between the Hawaiian Islands and the Philippines. It is conspicuously absent except at three stations along the line from Guam to Yokohama, being replaced at corresponding depths by volcanic mud. It is probable that this belt of volcanic mud does not extend far from the range of volcanic islands along which the cable route passes.

The least depth at which a distinctly red clay deposit has been noted is at station 680—2,010 fathoms. It is always found in abysmal depths. Ordinarily, as the contour line rises above the 2,500-fathom mark foraminifera rapidly increase in numbers and perfection of form, and soon justify the classification of the deposit under the head of globigerina ooze.

Globigerina ooze.—Globigerina ooze is defined as a deposit containing over 30 per cent of calcium carbonate, principally in the form of minute shells of foraminifera. Other organic remains commonly found in this deposit are sponge spicules, radiolaria, diatoms, and the very minute coccoliths and rhabdoliths. As a rule, in this part of the Pacific Ocean globigerina ooze will be found wherever the depth is less than 2,200 fathoms. The exceptions are found in the region of volcanic islands or submarine volcanic peaks where the foraminifera seem to be overwhelmed by volcanic sand, and in the vicinity of island shores where coral sand or blue or green mud may predominate. The globigerina ooze, wherever found on the line of this survey, is composed principally of the few species (about 20) of foraminifera known to be pelagic. Bottom living species are rare and individually few in number. The proportion of mineral matter, other than calcium carbonate, in this deposit is relatively small. Manganese concretions are generally present and sometimes quite numerous, and fragments of pumice are common. Crystals and spherules of phillipsite are often noted. The finer mineral fragments are quite lost in the mass of foraminifera, but appear when the latter are dissolved out with acid. At one station—643, 1,757 fathoms—the cavities of very many of the shells were found to be filled with a siliceous deposit forming complete casts of the

interior of the shells, even to the minute foramina. These casts are also noted twice in volcanic mud (stations 991 and 1065). Doubtless examples of these casts might be found in many other samples of globigerina ooze.

Diatom ooze.—Diatom ooze is the name given to a deep-sea deposit of which the principal constituent is the siliceous frustules of diatoms. Previous to this survey such a deposit had not been found in any tropical waters, and was supposed to be "confined to the Southern or Antarctic oceans, or to the northern parts of the North Pacific." Unexpectedly, therefore, many distinct patches of characteristic diatom ooze were found on the line, especially between Guam and Luzon, latitude 14° 28′ to 14° 50′ north, and longitude 136° to 130° 30′ east. Along this tract, about 300 miles in length, diatom ooze was recovered at stations, as follows:

Diatom ooze.

Station.	Latitude.	Longitude.	Depth.
	° ′ ″	° ′ ″	*Fathoms.*
743	14 28 00	136 00 00	3,118
744	14 26 30	135 50 30	2,879
746	14 24 00	135 31 00	2,788
747	14 23 00	135 21 00	2,731
750	14 25 00	134 51 30	2,679
752	14 26 00	134 34 00	2,432
764	14 29 00	133 56 15	2,487
776	14 43 30	131 55 45	3,283
781	14 48 30	131 03 00	3,252
784	14 50 00	130 42 00	3,547
920	14 31 15	132 42 30	3,327
939	14 37 40	136 00 00	2,838
959	14 13 00	139 34 00	3,042

Between Guam and Midway Islands diatom ooze of the same nature appears at stations 559, 1710, and 1724. Also at stations 314 and 350 broken frustules of *Coscinodiscus rex* are noted.

As may be seen from the above table, the depths varied from 2,432 to 3,658 fathoms. In appearance the typical examples are greyish-white in color, shading off to a pale yellowish-brown wherever the fine red clay mud is present in any considerable proportion. In consistence it is mucilaginous, but is readily disintegrated by shaking with water. Radiolaria are generally rather numerous in this deposit. Mineral fragments are few. In all the specimens examined the diatoms belong almost exclusively to a single species identified by Professor Mann as *Coscinodiscus rex* Wallich. This is one of the largest diatoms known, having a diameter of about 0.8 millimeter, and is plainly visible to the naked eye. In form it resembles a minute pill box, with slightly rounded corners. The two valves (bottom and cover) are held together by a broad circumferential band. The valves are extremely thin and fragile, and the markings exceedingly delicate.

In some instances complete frustules are found, but usually the valves are separated and often much broken. A peculiar feature of this deposit is the strict limitation of the patches. Nearly pure diatom ooze may be recovered from one station, and at the next, five miles away, not a diatom appear in the desposit.

Radiolarian ooze.—No well-marked example of radiolarian ooze has been found in the specimens examined. Though radiolaria are noted in most of the samples, nowhere do they appear as a dominating constituent of the deposit. They are most numerous in the diatom oozes, where they are generally conspicuous by the number of individuals, but the number of species represented is not great.

Volcanic mud.—This is a deposit found in the neighborhood of volcanic islands or submarine volcanic peaks. Its characteristic constituents are pumice, glass, ashes, and the débris of volcanic rocks. It is often mixed with a considerable proportion of foraminifera when taken from depths less than 2,000 fathoms. Most often it is dark gray in color, and is readily disintegrated by shaking with water, being devoid of the sticky quality of red clay. This deposit is noted about the islands of Oahu and Guam, and nearly the whole distance from Guam to Yokohama, where the route passes along nearly parallel to the Ladroṅe and Bonin groups of volcanic islands, and at no great distance therefrom. The most conspicuous mineral constituent of this deposit is volcanic glass. It appears in various forms, the most frequent being the fibrous or filamentous variety. This has the appearance of having been drawn out when in a plastic state, sometimes into long, extremely fine threads, more commonly into larger threads or ribands, furrowed longitudinally, broken into short pieces, and always colorless and transparent as the finest artificial product. Another form is more massive, ragged in outline, dark brown, translucent, with numerous large, rounded cavities, and not so conspicuously suggestive of having been drawn out while cooling. A third variety consists of very fine, angular, perfectly transparent and colorless fragments, which often make up the bulk of the washed sediment. Red palagonite, coating fragments of other minerals is more frequently present in this deposit than in any other.

Blue mud.—Blue mud is the deposit generally found in inclosed or partially inclosed seas, and in the waters bordering continental land. It is composed for the most part of the débris carried out from the land by rivers or other currents. The few specimens collected by the *Nero* are blue-black in color, on the sides of the vial exposed to the light of a dark steel-blue with metallic luster, and iridescent. The color is said to be due to the presence of organic matter and iron sulphide. The odor of hydrogen sulphide is evident in all the well-corked vials of this mud. Except in deep waters foraminifera are more or less numerous. Radiolaria and diatoms are generally present, sometimes

in large numbers. Blue mud appears on the line of this survey only off the coasts of Luzon and Japan.

Green mud.—Green mud is found under the same conditions as blue mud. It is said to owe its color generally to the presence of the olive-green mineral glauconite, but sometimes to the presence of organic matter and its reducing action upon iron peroxide. In some instances the green color of the specimens has turned a bluish-black since recovery, and from present appearances would be called blue mud. In all the specimens of green mud the tinge of green is faint, and the greenish grains of sand comprise but a small part of the sediment. A large part of the coloration must be due to extremely minute amorphous mineral matter, since the supernatant water in the settling-glass remains cloudy and tinged with green after standing for an hour, and is not cleared or decolorized by nitro-hydrochloric acid. No glauconitic casts of foraminifera have been noted in these specimens. Green mud is recorded at several stations in Dingala Bay, coast of Luzon, and at all stations but one from No. 1217 to the anchorage near Yokohama, a distance of about 70 miles.

RECORD OF THE DETAILED EXAMINATION OF SELECTED SPECIMENS OF DEPOSITS FROM STATIONS ON THE OUTWARD VOYAGE OF THE NERO.

(A) HONOLULU TO MIDWAY ISLANDS.

Station 1.—923 fathoms. Volcanic mud. Sediment, after removal of "fine washings" by decantation, contains many foraminifera, a few sponge spicules, radiolarians, and diatoms. About 30 per cent of the sediment consists of fragments of volcanic rock and pumice. Many minute magnetic particles.

Station 4.—1,393 fathoms. Volcanic mud. Foraminifera numerous; sponge spicules, radiolarians, and diatoms few. Fine volcanic sand in small proportion.

Station 6.—2,438 fathoms. Volcanic mud. Foraminifera, radiolaria, diatoms, sponge spicules. Very fine volcanic ashes.

Station 11.—1,983 fathoms. Volcanic mud. Foraminifera (*Globigerina*, *Pulvinulina*, *Virgulina*, *Nonionina*, *Nodosaria*, *Hastigerina*). Radiolaria few. Diatoms few. About one-third the sediment fine volcanic sand.

Station 16.—2,438 fathoms. Volcanic mud. Color, pale yellowish brown. No foraminifera, a few radiolarians and diatoms. Mineral matter, fine volcanic sand. Many small fragments of pumice with minute manganese-iron concretions forming upon the surface.

Station 22.—2,673 fathoms. Red clay. No foraminifera; a few large radiolarians (*Oroplegma diplosphæra* Hæckel), mostly in fragments. Mineral fragments very small.

Station 28.—2,650 fathoms. Red clay. Fawn colored. No organic remains except a few radiolaria. Specimen consists almost entirely of fine amorphous clayey matter.

Station 36.—2,432 fathoms. Red clay. No foraminifera or radiolaria. Sediment, after removal of fine washings, small in quantity and composed entirely of minute particles of sand.

Station 46.—2,723 fathoms. Red clay. Fawn colored. Fine mud, with a few minute mineral fragments, none larger than 0.08 millimeter.

Station 65.—2,750 fathoms. Red clay. No organic remains except an occasional radiolarian. Mineral sediment small in quantity and exceedingly fine.

Station 81.—2,908 fathoms. Red clay. Mostly "fine washings;" a few minute radiolaria and mineral particles. No calcareous organisms.

Station 93.—1,463 fathoms. Globigerina ooze. Light grayish-brown. Broken shells of foraminifera; few complete ones. No coccoliths. Nodules of manganese; many rather coarse mineral fragments.

Station 100.—2,552 fathoms. Red clay. Fawn colored. Foraminifera few and much broken; no other organic remains. Coarse volcanic sand in large proportion.

Station 106.—2,002 fathoms. Specimen consists of three manganese-iron nodules, the largest about 12 millimeters in diameter. This is as large an object as the opening in the sounding cup would admit. The finer material was washed out of the cup during its return to the surface, the closure of the valve having been prevented by the nodules.

Station 110.—2,655 fathoms. Red clay. A few foraminifera. No other organic remains. Very small mineral sediment, principally volcanic glass.

Station 124.—1,726 fathoms. Globigerina ooze. Color, grayish-white. Sediment almost exclusively composed of foraminifera: *Orbulina*, *Globigerina*, *Pulvinulina*, *Polystomella*, *Verneuilina*, *Erhenbergina* (*hystrix*), the latter rather frequent. Few mineral particles. A few coccoliths and rhabdoliths.

Station 125.—2,230 fathoms. Globigerina ooze. Color, brownish-white. Foraminifera: *Globigerina*, *Pulvinulina*, *Rotalia*, *Ehrenbergina* (*hystrix*). Coccoliths; no radiolaria or diatoms. Nodules of phillipsite; decomposed pumice, coarse and fine.

Station 126.—2,627 fathoms. Red clay. Although this station is only 5 miles distant from the last, the foraminifera have entirely disappeared, and the deposit shows only amorphous matter, an occasional radiolarian, and a few mineral fragments.

Station 152.—3,026 fathoms. Red clay. Only a few particles larger than 0.3 millimeter. A single fragment of an arenaceous foraminifera (*Psammosphæra fusca*). No calcareous organisms. Fragments of large radiolarian (Oroplegma). Minute manganese concretions. Fine sand.

Station 163.—2,603 fathoms. Red clay. Fawn colored. No foraminifera; many radiolaria; few diatoms; sponge spicules. Mineral fragments very small in size and quantity.

Station 165.—2,135 fathoms. Globigerina ooze. Color, pale yellowish-brown. Sediment principally pelagic foraminifera; many coccoliths. Few mineral fragments.

Station 166 to 174.—1,593 to 2,111 fathoms. Globigerina ooze. Color varies from nearly white to pale yellowish-brown, according to

the proportion of foraminifera, which latter seems to be intimately related to the depth. Foraminifera: *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, *Pullenia*, *Miliolina*, *Ehrenbergina*, *Cyclammina*, *Virgulina*, *Uvigerina*, *Lagena*, *Discorbina*, *Polystomella*, *Nodosaria*, *Sphæroidina*. Coccoliths more or less numerous, rhabdoliths few; sponge spicules; radiolaria not numerous except at station 174; diatoms few. Mineral fragments very few.

Station 175.—1,239 fathoms. This specimen vial contained only a few brownish-black fragments of a manganese nodule.

Station 185.—2,757 fathoms. Red clay. Brown-gray. Very fine mud, with a few sponge spicules, radiolaria, and an occasional diatom.

Station 187.—2,473 fathoms. Globigerina ooze. Color, light gray. The washed sediment consists of broken foraminifera, radiolaria, diatoms, and a very little fine sand.

Station 189.—1,813 fathoms. Globigerina ooze. Grayish-white. Foraminifera: *Biloculina*, *Orbulina*, *Pulvinulina*, *Uvigerina*, *Globigerina*, *Nodosaria*, *Lagena*, *Pullenia*, *Virgulina*, *Polystomella*. Coccoliths and rhabdoliths not numerous; occasional small radiolaria and diatoms. Mineral fragments very few.

(B) MIDWAY ISLANDS TO GUAM.

Station 205.—2,167 fathoms. Globigerina ooze. Light brown. Foraminifera mostly in fragments. A few radiolaria; many coccoliths. Mineral particles rare.

Station 209.—82 fathoms. Coral sand. Fragments of coral rock. Foraminifera (*Amphistigina*), polyzoa, and univalve mollusks. (This is the only specimen from a sounding less than 100 fathoms.)

Station 211.—2,322 fathoms. Red clay. Color, light brown. Specimen consists almost exclusively of fine washings. A few broken foraminifera, an occasional radiolarian, and the usual mineral fragments.

Station 225.—2,926 fathoms. Red clay. Total sediment consists of fine washings, with an occasional radiolarian and sponge spicule and a few small fragments of volcanic glass.

Station 238.—3,012 fathoms. Red clay. No effervescence with acid. No organic remains, except rarely a sponge spicule or fragments of a radiolarian. The few mineral particles are minute, colorless, transparent, vitreous fragments.

Station 248.—3,168 fathoms. Red clay. Light brown. A few radiolaria; no other organic remains. No effervescence with acid. Mineral particles very small, transparent fragments.

Station 257.—3,250 fathoms. Red clay. No calcareous organisms; a few radiolaria and sponge spicules. A large sediment of mineral fragments in great variety. Numerous small manganese nodules. Crystals and spherules of phillipsite.

Station 271.—3,240 fathoms. Red clay. Light brown, extremely fine mud. An occasional radiolarian; no other organic remains. No mineral particles larger than 0.08 millimeter.

Station 285.—3,089 fathoms. Red clay. Many minute manganese concretions.

Station 295.—3,274 fathoms. Red clay. Many small concretions of manganese and crystals of phillipsite, single and crossed.

Station 314.—3,237 fathoms. Red clay. Extremely fine mud. No mineral particles exceeding 0.08 millimeter in diameter. Gelatinous masses containing great numbers of fragments of large diatoms. (*Coscinodiscus rex* Wallich.) A few radiolaria.

Station 331.—2,997 fathoms. Red clay. Color, brown. No calcareous organisms. At least one-half of the washed sediment consists of crystals of phillipsite. Many small nodules of manganese. This specimen is unique in the preponderance of clear-cut crystals of phillipsite.

Station 335.—2,845 fathoms. Red clay. Light brown, very fine mud. No calcium carbonate. A few radiolarians. Minute nodules of manganese; a few crystals of phillipsite and glassy mineral fragments.

Station 336.—2,424 fathoms. Red clay. Broken shells of foraminifera begin to appear. Active effervescence with acid. Distance from preceding station about 11 miles; difference in depth, 421 fathoms.

Station 338.—2,128 fathoms. Globigerina ooze. Fawn color. Contains a large proportion of foraminifera, mostly broken and corroded; a few coccoliths. Fragments of pumice; many concretions of manganese of considerable size (6 millimeters), spherules of phillipsite, and minute glassy fragments.

Station 345.—1,173 fathoms. Pure globigerina ooze. Color, white, with slight shade of brown. Sediment composed almost entirely of perfect foraminifera (*Globigerina*, *Pulvinulina*, and *Orbulina*), with rarely a grain of sand.

Station 350.—2,240 fathoms. Red clay. Reddish-brown mud, containing many foraminifera, diatoms (fragments of *Coscinodiscus*), manganese concretions of considerable size (6 millimeters), crystals and spherules of phillipsite, and volcanic mineral particles.

Station 352.—2,568 fathoms. Red clay. Only an occasional corroded fragment of a foraminifer. The usual small manganese nodules, crystals of phillipsite, and other minerals.

Station 356.—2,897 fathoms. Red clay. Washed sediment very fine, consisting of a few minute manganese concretions and an abundance of single and crossed crystals of phillipsite.

Station 361.—2,268 fathoms. Red clay. Fawn-colored mud. Washed sediment composed largely of manganese nodules of consid-

erable size (up to 6 millimeters), and a small proportion of foraminifera mostly broken and corroded.

Station 362.—1,937 fathoms. Typical globigerina ooze. Pinkish-white. Very little fine washings. Sediment almost entirely foraminifera (*Globigerina*, *Orbulina*, *Pulvinulina*, *Lagena*, *Cassidulina*, *Ehrenbergina*, *Virgulina*, *Pullenia*). No radiolaria or diatoms observed. Very few coccoliths.

Station 369.—966 fathoms. Globigerina ooze. Foraminifera of the common pelagic species.

Station 373.—2,153 fathoms. Red clay. Fine yellowish-brown mud. A few foraminifera, mostly in corroded fragments. Manganese concertions, crystals and spherules of phillipsite, and minute magnetic particles.

Station 376.—2,780 fathoms. Red clay. Yellowish-brown. Almost entirely fine washings. No organic remains; very few mineral fragments.

Station 385.—720 fathoms. Globigerina ooze. (*Globigerina*, *Orbulina*, *Pulvinulina*, *Sphaeroidina*, *Cristellaria.*) An occasional radiolarian and bit of sand.

Station 390.—3,006 fathoms. Red clay. Exceedingly fine brown mud. Only separable residue a few minute manganese concretions, crystals of phillipsite, and discoid radiolaria.

Station 400.—3,159 fathoms. Red clay. Light yellowish-brown, very fine mud, containing no organic remains, very few mineral fragments exceeding 0.08 millimeter in diameter, and many minute crystals of phillipsite.

Station 411.—3,188 fathoms. Red clay. Very fine brown mud. A few radiolarians and diatoms, small crystals of phillipsite, and minute glassy mineral fragments.

Station 427.—1,997 fathoms. Globigerina ooze. Grayish-white. Foraminifera much broken. A few perfect specimens of *Ehrenbergina hystrix*. Rather large manganese concretions, fragments of pumice and spherules of phillipsite. Minute fragments of volcanic glass.

Station 451.—3,150 fathoms. Red clay. Yellowish-brown fine mud, containing a few radiolaria. The washed sediment consists of fine volcanic glass, and other mineral fragments varying in color from dark red-brown to light brownish-yellow. Minute manganese particles and a few crystals of phillipsite.

Station 460.—689 fathoms. Globigerina ooze. The usual pelagic foraminifera, a very few coccoliths and rhabdoliths. Rarely a mineral fragment.

Station 463.—1,913 fathoms. Globigerina ooze. Specimen consists of a little globigerina ooze, and the fragments of a manganese

nodule, originally about 25 millimeters in diameter, probably broken by concussion of the sinker. Nucleus of the nodule is a porous, straw-colored fragment of pumice.

Station 478.—2,708 fathoms. Red clay. Dark brown. No foraminifera. A few radiolaria. Washed sediment mostly volcanic glass.

Station 498.—3,185 fathoms. Red clay. Numerous manganese concretions, crystals and nodules of phillipsite. No organic remains.

Station 506.—2,169 fathoms. Globigerina ooze. Color, brownish-white. Shells much broken. Foraminifera mostly pelagic; individual specimen of *Lagena gracilis.* A few coccoliths and rhabdoliths. Several rather large manganese nodules, 10 millimeters in diameter.

Station 521.—3,356 fathoms. Red clay. Chocolate color. No organic remains. Washed sediment consists of fine sand containing small manganese nodules, aggregated crystals of phillipsite, volcanic glass, and other minerals.

Station 530.—3,118 fathoms. Red clay. Brown mud. No organisms. Nodules of manganese and of phillipsite; decomposing pumice.

Station 541.—1,846 fathoms. Globigerina ooze. Creamy white. Foraminifera mostly pelagic. *Nonionina* noted. Very few mineral particles.

Station 559.—3,658 fathoms. Diatom ooze. Fine, light-brown mud. Relatively small quantity of clayey matter. Sediment composed of fragments of large diatoms; (*Coscinodiscus rex* Wallich) radiolaria in abundance. Volcanic ashes.

Station 575.—4,563 fathoms. Red clay. A fine, brown mud with a large percentage of clayey matter, and notable for the absence of manganese concretions. Washed sediment principally clear, transparent fragments of volcanic glass.

Station 591.—4,204 fathoms. Red clay. No organic remains. Mineral matter rather coarse volcanic fragments. Very few manganese concretions.

Station 600.—2,536 fathoms. Volcanic mud. Grayish-brown. No foraminifera; no effervescence with acid; a few radiolaria. Sediment consists of volcanic débris, with very little fine washings. Numerous manganese concretions, yellow-brown to red-brown particles of palagonite, and vitreous fragments.

Station 603.—1,745 fathoms. Volcanic mud. Gray, granular mud. About 25 per cent of the sediment consists of pelagic foraminifera: the remainder is a rather fine volcanic sand containing manganese concretions, palagonite, and vitreous fragments in large proportions. Many magnetic particles.

Station 613.—1,072 fathoms. Pure globigerina ooze. Pelagic foraminifera with few exceptions. One *Lagena globosa* and one *Gaudryina pupoides* noted.

Station 614.—3,230 fathoms. Red clay. No organic remains. Sediment of decomposing pumice and minute irregular fragments of perfectly transparent rock.

Station 615.—3,178 fathoms. Red clay. No organisms. Fine mineral fragments and occasional minute manganese nodules.

Station 637.—2,352 fathoms. Volcanic mud. Gray, granular noncoherent mud. Very little fine washings. Washed sediment contains a small proportion of foraminifera, arenaceous (*Jaculella*) and cretaceous, very many manganese nodules, volcanic glass, and other minerals not identified.

Station 643.—1,757 fathoms. Globigerina ooze. Brownish-gray. But little amorphous matter. Sediment mostly the usual pelagic forms of foraminifera, and fine, glassy mineral fragments. After action of acid there remain large numbers of white silicious casts of foraminifera, often quite perfect, even of the minute foramina of the shells.

Station 647.—605 fathoms. Globigerina ooze. Mostly pelagic foraminifera, with fine coral sand.

(C) GUAM TO LUZON.

Station 663.—457 fathoms. Coral sand. Blue-black (probably from chemical changes since collection). Contains shells of small univalve and bivalve mollusks, fragments of coral, foraminifera (*Pulvinulina*, *Cristellaria*, *Cassidulina*, *Miliolina*, *Nonionina*, *Amphistegina*, *Lagena*), manganese nodules, and much fine mineral sand.

Station 670.—1,376 fathoms. Volcanic mud. Yellowish-brown to black, very irregular fragments of transparent or translucent volcanic glass. The fragments have a resinoid luster, are porous, sharply angular, often fibrous, as if drawn out when in a semifluid state. A few foraminifera.

Station 674.—1,946 fathoms. Volcanic mud. Very pale yellowish-brown. Sediment consists of a few foraminifera and radiolaria, and a large proportion of minute splinters of volcanic glass. Many particles of palagonite.

Station 688.—1,346 fathoms. Globigerina ooze. Contains a very large number of manganese nodules.

Station 705.—2,710 fathoms. Red clay. No foraminifera; a few radiolaria and manganese nodules. Volcanic ashes.

Station 715.—2,639 fathoms. Red clay. Many manganese concretions coating fragments of volcanic minerals.

Station 722.—2,476 fathoms. Red clay. A chocolate-colored, very sticky mud. No organic remains. Granular coatings of manganese upon fragments of pumice and lumps of clay. Volcanic ashes.

Station 730.—2,761 fathoms. Red clay. Pale yellowish-brown, very fine mud. Rarely a radiolarian or diatom. Mineral matter small in quantity and minute in size

Station 740.—2,735 fathoms. Red clay. Yellowish-brown. No organisms noted. Many small manganese nodules; very little other mineral matter.

Station 743.—3,118 fathoms. Diatom ooze. A grayish-white mucilaginous mass, composed almost entirely of the more or less broken frustules of large diatoms, *Coscinodiscus rex* Wallich (identification by Prof. Albert Mann). Many radiolaria are found among the diatoms. There is very little clayey matter and few mineral fragments.

Station 744.—2,879 fathoms. Diatom ooze. Like the preceding specimen, except that it contains more clay, and radiolaria more numerous.

Station 745.—2,617 fathoms. Red clay. Extremely fine chocolate-colored mud with a few minute mineral fragments, but no diatoms or other organisms.

Station 746.—2,788 fathoms. About 9 miles from station 745. Diatom ooze. Same as station 743. Quite a large proportion of the valves in this specimen are unbroken. A few entire frustules.

Station 747.—2,731 fathoms. Ten miles from station 746. Red clay. A fine, sticky, deep yellowish-brown mud without trace of a diatom or other organism.

Station 748.—2,891 fathoms. Red clay. Same as station 747.

Station 749.—2,819 fathoms. Diatom ooze. Same as stations 743 and 746. The frusules are much broken, but belong to the same species, *Coscinodiscus rex.*

Station 750.—2,679 fathoms. Diatom ooze. Characters same as above. Many unbroken valves, and occasionally a complete frustule.

Station 751.—2,679 fathoms. Red clay. Dark yellowish-brown mud. No diatoms or radiolaria.

Station 752.—2,432 fathoms. Diatom ooze. Identical with station 743, except that the color is a darker gray.

Station 753.—1,913 fathoms. Globigerina ooze. Nearly the whole sediment consists of pelagic species of foraminifera; rarely a radiolarian; not a fragment of a *Coscinodiscus.*

Station 760.—1,560 fathoms. Globigerina ooze. Very few coccoliths. Foraminifera usual pelagic species, and *Nodosaria*, *Lagena* (*sulcata*), *Pulvinulina* (*pauperata*).

Station 764.—2,487 fathoms. Diatom ooze. Light yellowish-brown. Washed sediment consists of fragments of *Coscinodiscus rex* Wallich, with many radiolaria.

Station 770.—2,888 fathoms. Red clay. Very fine chocolate-colored mud. No organisms. Few minute mineral fragments.

Station 776.—2,383 fathoms. Diatom ooze. Pale yellowish-brown. Consists of diatoms (*Coscinodiscus rex*) with a considerable proportion of fine clay.

Station 777.—3,421 fathoms. Red clay. Color, brown. No diatoms; a few radiolaria. The usual minute manganese particles and fine mineral sand.

Station 781.—3,252 fathoms. Diatom ooze. Whole deposit consists of broken frustules of *Coscinodiscus*.

Station 783.—3,264 fathoms. Red clay. A single small manganese nodule and one arenaceous foraminifer (*Reophax*) noted. Residue, fine mud with minute vitreous fragments.

Station 784.—3,547 fathoms. Diatom ooze. Fine clayey matter predominates, but fragments of *Coscinodiscus* make a large proportion of the deposit.

Station 790.—3,119 fathoms. Red clay. Very fine yellowish-brown mud containing a few radiolaria and fine mineral particles.

Station 796.—2,670 fathoms. Red clay. Very fine mud, light chocolate color. Contains a few radiolaria, and mineral fragments rarely exceeding 0.08 millimeter in diameter.

Station 801.—3,298 fathoms. Red clay. Grayish-brown, not very adhesive mud, containing a few radiolaria and sponge spicules and a large proportion of very fine rock fragments.

Station 808.—2,855 fathoms. Red clay. Very fine light-brown mud. A few radiolaria and sponge spicules and a small proportion of mineral fragments.

Station 812.—3,130 fathoms. Red clay. Very fine yellowish-brown mud, leaving, after washing, a small sediment of radiolaria and fine mineral particles.

Station 818.—3,182 fathoms. Red clay. Brown mud containing fine sand and a few radiolaria and sponge spicules.

Station 822.—2,427 fathoms. Red clay. Dark brown. No organic remains. Washed sediment mostly colorless transparent mineral fragments and fibrous volcanic glass.

Station 828.—1,390 fathoms. Blue mud. Had distinct odor of hydrogen sulphide when vial was first opened. Brownish-gray color. Contains a few foraminifera, radiolaria, and casts. Much the largest part of the sediment consists of angular transparent fragments of rock, for the most part less than 0.08 millimeter diameter.

Station 833.—2,740 fathoms. Red clay. Light gray brown very fine mud. No effervescence with acid. Radiolaria, sponge spicules and a few diatoms. Minute angular rock fragments in large proportion.

Station 850.—157 fathoms. Green mud. Dark greenish brown. A few sponge spicules; no foraminifera or radiolaria noted. Washed sediment consists of angular rock fragments, many of them various shades of green.

(D) GUAM TO YOKOHAMA, JAPAN.

Station 990.—859 fathoms. Coral sand. Color, gray. Fragments of coral rock. Many foraminifera; a few radiolaria. Many small manganese concretions and particles of palagonite, the latter being unusually numerous. Mineral fragments in quantity, angular, many of them green.

Station 995.—2,091 fathoms. Volcanic mud. No calcium carbonate. No organic remains. Very little fine washings. Sediment principally volcanic glass.

Station 1000.—1,947 fathoms. Volcanic mud. Very little fine mud. An occasional foraminifer and radiolarian. Sediment mostly fibrous volcanic glass.

Station 1006.—1,847 fathoms. Volcanic mud. Brownish gray. Foraminifera few; radiolaria rather numerous. Mineral matter fine volcanic glass.

Station 1010.—2,082 fathoms. Volcanic mud. Few foraminifera. Sediment, fine angular particles of volcanic sand. Very few of the fibrous fragments of glass so plentiful at stations 1000 and 1006.

Station 1016.—2,375 fathoms. Volcanic mud. Color, dark brown. About 50 per cent of fine washings; few foraminifera. The remainder consists of fine angular particles of volcanic sand.

Station 1026.—2,025 fathoms. Volcanic mud. Grayish brown. Few foraminifera; radiolaria rather numerous. Sediment chiefly angular mineral fragments in great variety. Fine washings 35 per cent of total sediment, but a large proportion of these washings consists of minute fragments of minerals.

Station 1036.—2,155 fathoms. Volcanic mud. Light brown, finely granular, nonadhesive mud, containing a few foraminifera and a relatively small amount of amorphous matter. The remainder is made up of fine angular mineral fragments.

Station 1045.—2,330 fathoms. Volcanic mud. Dark brown. No foraminifera, a few radiolaria, about 25 per cent of amorphous matter and volcanic sand.

Station 1055.—2,028 fathoms. Volcanic mud. Dark brown. No foraminifera or diatoms, radiolaria rather numerous. Washed sediment consists of manganese concretions and angular, colorless, transparent mineral fragments; many palagonite particles.

Station 1065.—1,321 fathoms. Volcanic mud. Light gray, granular, nonadhesive. Many foraminifera and siliceous casts; occasional radiolaria; much fine volcanic sand in angular particles.

Station 1074.—483 fathoms. Volcanic sand. Specimen consists of comparatively coarse volcanic sand, with a few foraminifera.

Station 1084.—2,313 fathoms. Volcanic mud. Light brownish gray, granular. An occasional foraminifer; many radiolaria. Much

volcanic glass, some of it of the brown porous variety, some filamentous, and the remainder sharp, angular, perfectly transparent fragments.

Station 1094.—3,495 fathoms. Red clay. Brown, sticky mud, consisting largely of amorphous clayey matter, with a small quantity of mineral fragments of a distinctly volcanic character.

Station 1104.—2,214 fathoms. Volcanic mud. Specimen consists of a single lapillus of brown porous volcanic glass about 6 millimeters in diameter.

Station 1110.—2,870 fathoms. Volcanic mud. A few arenaceous foraminifera (*Rhabdaminina*, *Haplophragmium*) and radiolaria. Sediment composed almost entirely of volcanic glass.

Station 1120.—1,710 fathoms. Volcanic mud. Yellowish-brown granular mud, containing a few foraminifera, many radiolaria, and much volcanic sand, of which the larger particles are dark-brown glass.

Station 1126.—927 fathoms. Volcanic mud. A few foraminifera (*Globigerina*, *Pulvinulina*, *Pullenia*, *Uvigerina*). The rest of sediment volcanic sand.

Station 1132.—2,950 fathoms. Volcanic mud. Brownish gray, granular. No foraminifera; few radiolaria. Large proportion of volcanic sand, principally brown glass, and olive-green rounded mineral fragments.

Station 1142.—2,682 fathoms. Volcanic mud. No effervesence with acid. Many radiolaria; a few diatoms. Small manganese concretions; lapilli and fine fragments of volcanic glass.

Station 1151.—1,686 fathoms. Globigerina ooze. Very light gray. Contains 30 per cent or more of foraminifera, coccoliths, and rhabdoliths. Small manganese concretions and vitreous mineral fragments, with many red particles of palagonite.

Station 1168.—2,933 fathoms. Volcanic mud. No foraminifera, a few radiolaria and diatoms; large proportion of rather coarse sand and fine volcanic glass.

Station 1185.—1,491 fathoms. Volcanic mud. Color, light gray, slowly turning black with time. Many foraminifera (*Globigerina*, *Orbulina*, *Pullenia*, *Polystomella*, *Biloculina*, *Nonionina*, *Nodosaria*); radiolaria numerous; diatoms few. Many manganese concretions; much colorless volcanic glass, palagonite, and a variety of unidentified minerals.

Station 1197.—1,698 fathoms. Volcanic mud. Light gray, becoming black. A few foraminifera; very many radiolaria and diatoms. Manganese concretions, volcanic glass, palagonite, and various unidentified mineral fragments.

Station 1207.—665 fathoms. Blue mud. Blue black. Distinct odor of hydrogen sulphide, increased by addition of hydrochloric acid.

Contains a few small foraminifera and radiolaria. Coarse mineral fragments, many of them black. Many fragments coated with red palagonite.

Station 1217.—934 fathoms. Green mud. Dark gray. Has evidently changed color since collection, for it is noted on record as "gr. m.," green mud. Marked odor of hydrogen sulphide. The washed sand consists principally of vitreous fragments, some of them dark brown and nearly opaque, others clear and transparent. Occasional pale-green grains. No casts.

Station 1237.—613 fathoms. Green mud. Turned black from development of hydrogen sulphide since collection. A few foraminifera; very many diatoms; no radiolaria. Much fine sand.

ABSTRACT OF THE OFFICIAL RECORD OF SOUNDINGS.

HAWAIIAN ISLANDS TO MIDWAY ISLANDS.

[Columns marked "Deposit" and "Remarks" supplied by the compiler.]

Station No.	Date.	Latitude north.	Longitude west.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1	May 6	21 12 00	158 11 00	923	78	.....	.....	gn. m. fn. s..	Volcanic mud.	
2	....do ...	21 12 00	158 11 00	904	78	.....	.....	gn. m. fn. s..	.....	No specimen.
3	....do ...	21 25 00	158 28 00	1,299	81	78	.....	.....	.....	Do.
4	....do ...	21 30 00	158 30 00	1,393	80	78	.....	br. m. fn. s..	Volcanic mud.	
5	....do ...	21 53 00	158 30 00	964	73	76	.....	.....	.....	Do.
6	....do ...	22 04 00	158 30 00	2,201	74	76	.....	fn. br. m	Volcanic mud.	
7	May 7	22 12 00	158 40 00	2,032	74	74	.....	.....	.....	Do.
8	....do ...	22 14 00	158 42 00	1,802	.....	.....	.....	.....	.....	Do.
9	....do ...	22 21 00	158 51 00	2,242	74	74	.....	fn. br. m	Volcanic mud.	
10	....do ...	22 23 00	158 54 00	2,098	74	75	.....	fn. br. m	.....do	
11	....do ...	22 30 00	159 05 00	1,963	75	75	.....	fn. br. m	.....do	With foraminifera.
12	....do ...	22 33 00	159 07 00	1,924	74	75	.....	fn. br. m	.....do	
13	....do ...	22 40 00	159 16 00	1,801	79	75	.....	.....	.....	No specimen.
14	....do ...	22 41 00	159 20 00	1,866	79	76	.....	.....	.....	Do.
15	....do ...	22 50 00	159 29 00	2,443	75	76	.....	br. m. fn. s..	Volcanic mud.	
16	... do ...	22 51 00	159 30 00	2,438	74	76	.....	br. m. fn. s..	.....do	Fine volcanic sand.
17	....do ...	22 58 00	159 37 00	2,709	.....	.....	35.1	br. m. fn. s..	.....do	
18	....do ...	23 00 00	159 38 00	2,864	74	75	.....	.....	.....	No specimen.
19	....do ...	23 05 00	159 47 00	2,700	73	75	.....	br. m	Red clay ..	
20	....do ...	23 07 00	159 50 00	2,704	74	75	.....	br. m	.....do	
21	May 8	.....	.....	.....	.....	.....	.....	.....	.....	No record.
22	....do ...	23 13 00	159 59 00	2,673	.....	.....	.....	br. m	Red clay ..	
23	....do ...	23 13 00	160 01 00	2,664	75	74	35.3	lt. br. m. dk. s.	.....do	
24	....do ...	23 18 00	160 10 00	2,644	76	75	.....	br. m	.....do	
25	....do ...	23 20 00	160 12 00	2,650	78	75	.....	br. m	.....do	
26	....do ...	23 24 00	160 22 00	2,704	78	75	.....	br. m. fn. s..	.....do	
27	....do ...	23 25 00	160 23 00	2,788	78	75	.....	br. m. fn. s..	.....do	
28	....do ...	23 29 00	160 33 00	2,650	79	76	.....	br. m. fn. s..	.....do	
29	....do ...	23 29 00	160 35 00	2,652	79	76	.....	br. m. fn. s..	.....do	
30	....do ...	23 34 00	160 40 00	2,648	75	76	.....	br. m. fn. s..	.....do	
31	May 9	23 35 00	160 48 00	2,724	75	74	.....	br. m. fn. sp.	.....do	
32	....do ...	23 39 00	161 00 00	2,699	75	75	.....	br. m. fn. sp.	.....do	
33	....do ...	23 40 00	161 03 00	2,572	74	75	.....	br. m. fn. sp.	.....do	
34	....do ...	23 45 00	161 15 00	2,466	76	75	.....	br. m. fn. sp.	.....do	
35	....do ...	23 46 00	161 18 00	2,467	75	75	35	br. m. fn. sp.	.....do	
36	....do ...	23 51 00	161 31 00	2,432	75	74	.....	br. m. fn. sp.	.....do	
37	....do ...	23 52 00	161 33 00	2,453	79	74	.....	br. m. fn. sp.	.....do	
38	....do ...	23 56 00	161 45 00	2,471	78	76	.....	br. m. fn. sp.	.....do	
39	....do ...	23 58 00	161 47 00	2,474	77	76	.....	br. m. fn. sp.	.....do	
40	....do ...	24 01 00	161 56 00	2,435	75	76	.....	br. m. fn. sp.	.....do	
41	....do ...	24 02 00	161 58 00	2,484	75	76	.....	.....	.....	No specimen.
42	....do ...	24 06 00	161 08 00	2,574	75	76	.....	br. m. fn. sp.	Red clay ..	
43	May 10	24 07 00	162 10 00	2,600	74	75	.....	br. m. fn. sp.	.....do	
44	....do ...	24 10 00	162 20 00	2,718	74	75	.....	br. m. fn. sp.	.....do	
45	....do ...	24 11 00	162 22 00	2,671	74	75	.....	.....	.....	Do.
46	....do ...	24 15 00	162 32 00	2,723	74	75	.....	br. m.....	Red clay...	
47	....do ...	24 16 00	162 35 00	2,706	79	75	.....	br. m.....	.....do	
48	....do ...	24 20 00	162 47 00	2,722	79	75.5	.....	br. n.....	.....do	
49	....do ...	24 21 00	162 49 00	2,726	81	76	35	br. m.....	.....do	
50	....do ...	24 23 00	163 01 00	2,732	81	75	.....	br. m.....	.....do	
51	....do ...	24 24 00	163 04 00	2,739	79	75	.....	br. m.....	.....do	
52	....do ...	24 26 00	163 15 00	2,742	79	75	35	br. m.....	.....do	
53	....do ...	24 26 00	163 18 00	2,759	77	75	.....	br. m.....	.....do	

Abstract of the official record of soundings—Continued.

HAWAIIAN ISLANDS TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude west.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
54	May 11	24 28 00	163 28 00	2,779	73	75	35	br. m.....	Red clay...	
55	....do...	24 28 00	163 30 00	2,765	73	75	.....	br. m.....	.....do.....	
56	....do...	24 30 00	163 41 00	2,742	76	75	35	br. m.....	.....do.....	
57	....do...	24 31 00	163 44 00	2,727	77	75	.....	br. m.....	.....do.....	
58	....do...	24 32 00	163 54 00	2,722	80	76	.....	br. m.....	.....do.....	
59	....do...	23 33 00	163 57 00	2,718	79	75	.....	.....	.....	No specimen.
60	....do...	24 37 00	164 07 00	2,722	77	75	35	br. m.....	Red clay...	
61	....do...	24 38 00	164 09 00	2,723	75	75	.....	br. m.....	.....do.....	
62	....do...	24 41 00	164 18 00	2,737	75	75	35	br. m.....	.....do.....	
63	....do...	24 42 00	164 20 00	2,746	74	74	.....	br. m.....	.....do.....	
64	May 12	24 46 00	164 29 00	2,746	74	74	35	br. m.....	.....do.....	
65	....do...	24 46 00	164 31 00	2,750	74	74	.....	br. m.....	.....do.....	
66	....do...	24 50 00	164 41 00	2,775	73	74	35	br. m.....	.....do.....	
67	....do...	24 51 00	164 43 00	2,780	74	74	.....	br. m.....	.....do.....	
68	....do...	.....	.....	.....	.....	.....	.....	.....	.....	No record.
69	....do...	24 55 00	164 52 00	2,772	75	75	.....	br. m.....	Red clay...	
70	....do...	24 55 00	164 53 00	2,765	75	75	.....	.....	.....	No specimen.
71	....do...	24 59 00	165 04 00	2,751	75	76	.....	.....	.....	Do.
72	....do...	25 03 00	165 13 00	2,744	74	76	.....	.....	.....	Do.
73	....do...	25 04 00	165 15 00	2,715	73	75	.....	.....	.....	Do.
74	....do...	25 07 00	165 24 00	2,741	74	74	.....	br. m.....	Red clay...	
75	....do...	25 08 00	165 26 00	2,741	74	74	.....	.....	.....	Do.
76	May 13	25 10 00	165 34 00	2,725	74	75	.....	br. m.....	Red clay...	
77	....do...	25 11 00	165 36 00	2,719	74	74	35	br. m.....	.....do.....	
78	....do...	25 13 00	165 44 00	2,735	71	74	35	br. m.....	.....do.....	
79	....do...	25 14 00	165 46 00	2,720	71	74	.....	br. m.....	.....do.....	
80	....do...	25 18 00	165 59 00	2,750	72	74	35.1	br. m.....	.....do.....	
81	....do...	25 21 00	166 11 00	2,908	78	74.5	.....	br. m.....	.....do.....	
82	....do...	25 22 00	166 13 00	2,760	75	73	.....	br. m. fn. sp.	.....do.....	
83	....do...	25 25 00	166 23 00	2,758	73	74	35	br. m. fn. sp.	.....do.....	
84	....do...	25 25 00	166 25 00	2,754	73	74	.....	br. m. fn. sp.	.....do.....	
85	....do...	25 28 00	166 37 00	2,756	73	73	.....	br. m. fn. sp.	.....do.....	
86	May 14	25 29 00	166 39 00	2,755	72	73	.....	br. m. fn. sp.	.....do.....	
87	....do...	25 32 00	166 51 00	2,765	72	73	35	br. m. fn. sp.	.....do.....	
88	....do...	25 33 00	166 54 00	2,770	73	74	.....	br. m. fn. and crs. sp.	.....do.....	Coarse mineral fragments.
89	....do...	25 36 00	167 05 00	2,535	74	74	35	br. m. fn. and crs. sp.	.....do.....	
90	....do...	25 37 00	167 07 00	2,299	74	73	.....	br. m. fn. and crs. sp.	.....do.....	
91	....do...	25 38 00	167 09 00	1,983	76	74	.....	fn. wh. s.....	Globigerina ooze.	
92	....do...	25 39 00	167 12 00	2,004	73	75	.....	fn. wh. s.....	.....do.....	
93	....do...	25 41 00	167 18 00	1,463	74	74	.....	fn. wh. s.....	.....do.....	
94	....do...	25 42 00	167 21 00	1,851	73	74	.....	.....	.....	No specimen.
95	....do...	.....	.....	.....	.....	.....	.....	.....	.....	Bottom not reached.
96	....do...	25 46 00	167 30 00	2,269	73	74	.....	br. m. wh. s. r.	.....	No specimen.
97	....do...	25 52 00	167 42 00	2,114	73	74	35	.....	.....	Do.
98	....do...	25 53 00	167 45 00	1,960	74	74	.....	fn. wh. s.....	Globigerina ooze.	
99	....do...	25 56 00	167 52 00	1,895	73	74	.....	rocky. G.....	.....	Do.
100	May 15	26 02 00	167 56 00	2,552	74	74	.....	br. m. and G.	Red clay...	Coarse volcanic sand.
101	....do...	26 09 00	168 07 00	2,445	72	74	.....	br. m. fn. sp.	.....do.....	
102	....do...	26 10 00	168 09 00	2,406	71	74	.....	br. m. fn. sp.	.....do.....	
103	....do...	26 16 00	168 21 00	2,554	75	74	35	br. m. fn. sp.	.....do.....	
104	....do...	26 17 00	168 23 00	2,536	78	74	.....	br. m. fn. sp.	.....do.....	
105	....do...	26 22 00	168 33 00	2,370	74	74	.....	br. m. fn. sp.	.....do.....	
106	....do...	26 23 00	168 35 00	2,002	75	74	.....	wh. s. R.....	Globigerina ooze.	
107	....do...	26 26 00	168 46 00	2,492	75	73	35.6	br. m. s. bk. sp.	Red clay...	
108	....do...	26 27 00	168 48 00	2,527	75	73	.....	br. m. s. bk. sp.	.....do.....	
109	....do...	26 29 00	168 57 00	2,662	74	74	.....	br. and gr. m.	.....do.....	
110	....do...	26 30 00	168 59 00	2,655	73	73	.....	br. and gr. m.	.....do.....	
111	....do...	26 32 00	169 08 00	2,642	73	73	35	br. m.....	.....do.....	
112	May 16	26 32 00	169 10 00	2,614	72	73	.....	br. m. wh. sp.	.....do.....	
113	....do...	26 34 00	169 20 00	2,493	72	73	35	br. m. wh. sp.	.....do.....	
114	....do...	26 34 00	169 22 00	2,541	73	74	.....	br. m.....	.....do.....	
115	....do...	26 36 00	169 31 00	2,494	73	75	35	br. m.....	.....do.....	
116	....do...	26 39 00	169 43 00	2,514	74	74	.....	br. m.....	.....do.....	
117	....do...	26 39 00	169 45 00	2,493	75	74	.....	br. m.....	.....do.....	
118	....do...	26 45 00	169 59 00	2,539	75	75	35.7	br. m.....	.....do.....	
119	....do...	26 46 00	170 02 00	2,523	73	75	.....	br. m.....	.....do.....	

Abstract of the official record of soundings—Continued.

HAWAIIAN ISLANDS TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude west.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
120	May 16	26 49 00	170 13 00	2,534	74	74	35	br. m.....	Red clay...	
121	....do ...	26 52 00	170 25 00	2,562	73	75	.....	br. m.....	.....do	
122	....do ...	26 55 00	170 37 00	2,571	72	74	.....	br. m. fn. sp.	.....do	
123	May 17	26 56 00	170 40 00	2,568	71	74	.....	br. m. fn. sp.	.....do	
124	....do ...	26 59 00	170 52 00	1,726	71	74	.....	wh. s. bk. sp.	Globigerina ooze.	
125	....do ...	27 00 00	170 55 00	2,230	71	74	.....	br. m. G.....	.....do	Pumice.
126	....do ...	27 02 00	171 01 00	2,627	71	74	.....	br. m. fn. sp.	Red clay...	
127	....do ...	27 03 00	171 08 00	2,636	74	75	35	br. m. fn. sp.	.....do	
128	....do ...	27 11 00	171 19 00	2,675	76	74	.....	br. m.....	.....do	
129	....do ...	27 12 00	171 21 00	2,678	76	75	.....	br. m.....	.....do	
130	....do ...	27 17 00	171 36 00	2,706	77	74	.....	br. m.....	.....do	
131	....do ...	27 22 00	171 49 00	2,716	72	74	44	br. m.....	.....do	
132	....do ...	27 26 00	172 00 00	2,732	72	74	.....	br. m.....	.....do	
133	....do ...	27 26 00	172 02 00	2,734	72	74	.....	br. m.....	.....do	
134	....do ...	27 29 00	172 11 00	2,734	70	74	.....	br. m.....	.....do	
135	May 18	27 30 00	172 13 00	2,734	70	74	.....	br. m.....	.....do	
136	....do ...	27 32 00	172 22 00	2,749	70	74	.....	br. m.....	.....do	
137	....do ...	27 33 00	172 24 00	2,812	70	74	.....	br. m.....	.....do	
138	....do ...	27 36 00	172 32 00	2,788	71	75	51.7	br. m.....	.....do	
139	....do ...	27 36 00	172 34 00	2,773	72	75	.....	br. m.....	.....do	
140	....do ...	27 39 00	172 44 00	2,763	71	75	44.8	br. m.....	.....do	
141	....do ...	27 43 00	172 55 00	2,801	71	75	.....	br. m.....	.....do	
142	....do ...	27 47 00	173 05 00	2,865	73	75	.....	.....	.....	No specimen.
143	....do ...	27 47 00	173 06 00	2,919	70	74	.....	br. m.....	Red clay...	
144	....do ...	27 51 00	173 16 00	2,873	69	73	35	br. m.....	.....do	
145	....do ...	27 55 00	173 25 00	2,863	69	72	35	br. m.....	.....do	
146	May 19	27 59 00	173 34 00	2,898	67	70	.....	br. m.....	.....do	
147	....do ...	28 03 00	173 43 00	2,910	67	71	35	br. m.....	.....do	
148	....do ...	28 07 00	173 52 00	2,925	69	71	.....	br. m.....	.....do	
149	....do ...	28 12 00	174 03 00	2,928	69	74	35	br. m.....	.....do	
150	....do ...	28 13 00	174 06 00	2,932	76	74	.....	br. m.....	.....do	
151	....do ...	28 18 00	174 17 00	2,945	72	72	.....	br. m.....	.....do	
152	....do ...	28 21 00	174 30 00	3,026	67	72	35	br. m.....	.....do	
153	....do ...	28 23 00	174 41 00	2,958	68	70	.....	br. m.....	.....do	
154	....do ...	28 25 00	174 51 00	2,943	67	70	.....	br. m.....	.....do	
155	....do ...	28 27 00	175 02 00	2,875	69	69	.....	br. m.....	.....do	
156	May 20	28 28 00	175 09 00	2,827	66	68	.....	br. m.....	.....do	
157	....do ...	28 31 00	175 20 00	2,732	66	68	35	br. m.....	.....do	
158	....do ...	28 33 00	175 25 00	2,675	66	68	.....	br. m.....	.....do	
159	....do ...	28 36 00	175 36 00	2,572	69	70	.....	br. m.....	.....do	
160	....do ...	28 39 00	175 46 00	2,637	72	69	.....	br. m.....	.....do	
161	....do ...	28 41 00	175 53 00	2,695	72	68	.....	br. m. fn. sp.	.....do	
162	....do ...	28 41 00	176 10 00	2,679	75	68	.....	br. m. fn. sp.	.....do	
163	....do ...	28 41 00	176 23 00	2,603	74	68	35	br. m. crs. sp.	.....do	
164	....do ...	28 41 00	176 25 00	2,471	69	67	.....	br. m. crs. sp.	.....do	
165	....do ...	28 41 00	176 37 00	2,135	68	69	.....	fn. co. s.....	Globigerina ooze.	
166	....do ...	28 41 00	176 40 00	1,850	69	71	.....	fn. co. s.....	.....do	
167	....do ...	28 41 00	176 43 00	1,593	69	72	.....	fn. co. s. and R.	.....do	Large mang. concretions.
168	May 21	28 41 00	176 45 00	1,667	68	72	.....	.....	.....	No specimen.
169	....do ...	28 41 00	176 48 00	2,426	69	70	35	.....	.....	Do.
170	....do ...	28 41 00	176 46 00	1,990	68	70	.....	fn. and crs. co. s.	Globigerina ooze.	
171	....do ...	28 39 00	176 46 00	1,913	68	70	.....	fn. and crs. co. s.	.....do	
172	....do ...	28 38 00	176 48 00	2,086	70	69	.....	fn. and crs. co. s.	.....do	
173	....do ...	28 43 00	176 39 00	2,111	71	72	35	fn. co. s. br. m.	.....do	
174	....do ...	28 42 00	176 42 00	1,849	73	72	.....	crs. co. s	.....do	
175	....do ...	28 41 00	176 45 00	1,239	73	72	.....	blk. r. co	.....do	Manganese nodule.
176	....do ...	28 48 00	176 45 00	2,227	73	72	.....	....	.....	No specimen.
177	....do ...	28 50 00	176 49 00	2,633	71	72	.....	....	.....	Do.
178	....do ...	28 54 00	176 46 00	2,478	71	72	.....	br. m. co. s. fn. sp.	Red clay...	
179	....do ...	28 54 00	176 48 00	2,416	71	71	.....	bk. r	.....do	Manganese concretions.
180	....do ...	28 54 00	176 50 00	2,893	70	69	.....	....	.....	
181	....do ...	28 51 00	176 56 00	2,836	69	68	.....	br. m. fn. sp.	Red clay...	
182	....do ...	28 47 00	177 01 00	2,865	69	70	35	br. m. fn. sp.	.....do	
183	May 22	28 44 00	177 07 00	2,796	69	70	.....	br. m. fn. sp.	.....do	
184	....do ...	28 41 00	177 12 00	2,805	68	70	.....	br. m. fn. sp.	.....do	
185	....do ...	28 39 00	177 15 00	2,757	69	70	.....	br. m. fn. sp.	.....do	

Abstract of the official record of soundings—Continued.

HAWAIIAN ISLANDS TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude west.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
186	May 22	28 36 00	177 20 00	2,539	69	70	.....	bk. co. r.....	.....	No specimen.
187	....do...	28 32 00	177 22 00	2,473	71	70	.....	co. s. and r..	Globigerina ooze.	
188	....do...	28 27 00	177 23 00	2,061	72	71	.....	wh. co. s....	.....do.....	
189	....do...	28 25 00	177 24 00	1,813	72	71	35	wh. co. s....	.....do.....	
190	....do...	28 22 00	177 23 00	864	71	71	.....	wh. co. s....	.....do.....	
191	....do...	28 20 00	177 24 00	51	71	70	.....	co.....	.....do.....	
192	....do...	28 20 00	177 23 00	155	71	70	.....	.....	.....	Do.
193	....do...	28 19 00	177 25 00	40	71	70	.....	.....	.....	Do.
194	....do...	28 17 00	177 26 00	47	71	70	.....	.....	.....	Do.
195	....do...	28 15 00	177 25 00	44	70	70	.....	.....	.....	Midway Islands.

MIDWAY ISLANDS TO GUAM.

196	May 24	28 14 00	177 25 00	20	....	.....	.....	co. s.....	.....	No specimen.
197	....do...	28 14 30	177 26 00	40	....	.....	.....	co. s.....	.....	Do.
198	....do...	28 14 30	177 27 00	70	....	.....	.....	co. s.....	.....	Do.
199	....do...	28 15 00	177 27 00	120	....	.....	.....	co. s.....	.....	Do.
200	....do...	28 15 00	177 28 30	625	73	71	.....	fn. wh. co. s. bl. sp.	Globigerina ooze.	
201	....do...	28 14 00	177 31 00	1,033	73	71	.....	fn. wh. co. s. bl. sp.	.....do.....	
202	....do...	28 14 00	177 33 00	1,361	73	71	.....	co. s. brk. sp.	.....do.....	
203	....do...	28 13 00	177 35 00	1,625	74	71	35	crs. co. s.....	.....do.....	
204	....do...	28 11 00	177 30 00	1,947	73	70	.....	fn. co. s.....	.....do.....	
205	....do...	28 07 00	177 42 45	2,167	73	70	.....	fn. co. s. br. m.	.....do.....	
206	....do...	28 04 00	177 46 50	2,055	72	70	.....	fn. co. s. br. m.	.....do.....	
207	....do...	28 02 00	177 48 40	1,842	72	71	.....	fn. co. s.....	.....do.....	
208	....do...	27 58 00	177 51 40	1,351	72	71	35.2	fn. co. s.....	.....do.....	
209	....do...	27 58 00	177 03 40	82	72	71	.....	co.....	Coral sand.	
210	....do...	27 57 00	177 41 15	1,718	72	71	.....	crs. co. s.....	Globigerina ooze.	
211	....do...	27 57 00	177 43 30	2,322	72	72	.....	fn. co. s. br. m.	Red clay ..	A few foraminifera.
212	....do...	27 52 00	177 44 00	2,036	72	72	35	crs. co. s.....	Globigerina ooze.	
213	....do...	27 50 00	177 43 00	2,367	72	72	.....	.....	.....	
214	....do...	27 46 00	177 41 00	2,539	72	72	.....	.....	.....	
215	May 25	27 42 00	177 40 30	2,577	73	71	.....	br. m.....	Red clay ..	
216	....do...	27 39 00	177 41 00	2,592	73	72	.....	br. m.....	.....do.....	
217	....do...	27 35 00	177 42 00	2,619	72	72	.....	br. m.....	.....do.....	
218	....do...	27 29 00	177 46 00	2,632	73	72	.....	br. m.....	.....do.....	
219	....do...	27 26 00	177 52 00	2,621	73	72	35	br. m.....	.....do.....	
220	....do...	27 22 00	178 05 30	2,654	73	72	.....	br. m.....	.....do.....	
221	....do...	27 19 00	178 16 30	2,768	73	73	.....	br. m.....	.....do.....	
222	....do...	27 16 00	178 29 00	2,850	73	73	35	br. m.....	.....do.....	
223	....do...	27 13 00	178 40 30	2,884	74	75	.....	br. m.....	.....do.....	
224	....do...	27 10 00	178 51 30	2,905	75	75	35	br. m.....	.....do.....	
225	....do...	27 09 00	179 01 15	2,926	73	74	.....	br. m.....	.....do.....	
226	May 26	27 08 00	179 10 30	2,939	75	75	35	br. m.....	.....do.....	
227	....do...	27 08 00	179 12 30	2,934	74	75	.....	br. m.....	.....do.....	
228	....do...	27 07 00	179 21 30	2,934	74	75	.....	br. m.....	.....do.....	
229	....do...	27 06 00	179 23 30	2,934	75	75	.....	br. m.....	.....do.....	
230	....do...	27 06 00	179 32 45	2,956	75	75	35	br. m.....	.....do.....	
231	....do...	27 05 00	179 42 30	2,948	76	74	.....	br. m.....	.....do.....	
232	....do...	27 03 00	179 53 15 East.	2,960	80	75	[a]39.4	br. m.....	.....do.....	
233	....do...	27 01 00	179 55 00	2,967	76	76	35	br. m.....	.....do.....	
234	....do...	26 58 00	179 42 15	2,959	78	76	.....	br. m.....	.....do.....	
235	....do...	26 55 00	179 31 45	2,982	75	76	35	br. m.....	.....do.....	
236	....do...	26 53 00	179 21 15	2,982	75	75	.....	br. m.....	.....do.....	
237	May 28	26 50 00	179 11 30	2,993	74	75	35	br. m.....	.....do.....	
238	....do...	26 48 00	179 01 15	3,012	74	74	.....	br. m.....	.....do.....	
239	....do...	26 45 00	178 51 15	3,048	75	74	[b]52	br. m.....	.....do.....	
240	....do...	26 42 00	178 40 00	3,046	75	74	.....	br. m.....	.....do.....	
241	....do...	26 39 00	178 30 45	3,000	75	75	35.5	br. m.....	.....do.....	
242	....do...	26 36 00	178 21 30	2,961	75	75	.....	br. m.....	.....do.....	
243	....do...	26 35 00	178 11 15	2,949	75	75	38.2	br. m.....	.....do.....	

[a] Marked "incorrect."

[b] "Incorrect."

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
244	May 28	26 32 00	178 00 15	3,138	75	75	38?	br. m	Red clay	
245	....do	26 29 00	177 48 45	3,003	76	75	.....	br. m	....do	
246	....do	26 26 00	177 36 30	3,035	75	75	35	br. m	....do	
247	May 29	26 22 00	177 23 00	3,072	75	75	.....	br. m	....do	
248	....do	26 21 00	177 19 45	3,168	74	75	.....	br. m	....do	
249	....do	26 18 00	177 06 30	3,148	77	75	35	br. m	....do	
250	....do	26 14 00	176 53 15	3,188	75	75	.....	br. m	....do	
251	....do	26 10 00	176 41 15	3,240	75	75	38.9?	br. m	....do	
252	....do	26 06 00	176 29 30	3,230	75	76	35	br. m	....do	
253	....do	26 01 00	176 16 00	3,252	77	76	.....	br. m	....do	
254	....do	25 57 00	176 04 45	3,242	75	75	.....	br. m	....do	
255	....do	25 57 00	175 53 00	3,240	75	75	35	br. m	....do	
256	May 30	25 50 00	175 42 30	3,260	75	75	.....	br. m	....do	
257	....do	25 47 00	175 32 00	3,250	75	76	60?	br. m. r. g	....do	
258	....do	25 43 00	175 21 30	3,246	78	77	35.1	br. m. r. g	....do	
259	....do	25 42 00	175 17 30	3,244	78	78	.....	br. c	....do	
260	....do	25 41 00	175 15 15	3,254	78	78	.....	br. c	....do	
261	....do	25 40 00	175 12 45	3,261	76	78	35	br. c	....do	
262	....do	25 37 00	175 02 00	3,276	77	78	.....	br. m	....do	
263	....do	25 34 00	174 51 00	3,259	78	78	.....	br. m	....do	
264	....do	25 31 00	174 39 40	3,231	77	77	35	br. m	....do	
265	....do	25 28 00	174 30 00	3,199	77	77	.....	br. m	....do	
266	May 31	25 26 00	174 21 30	3,245	76	77	35	br. m	....do	
267	....do	25 25 00	174 19 00	3,269	77	77	.....	br. m	....do	
268	....do	25 23 00	174 10 00	3,269	77	77	.....	br. m	....do	
269	....do	25 22 00	174 08 00	3,284	79	77	.....	br. m	....do	
270	....do	25 19 00	173 58 30	3,273	82	77	35	br. m	....do	
271	....do	25 17 00	173 49 45	3,240	86	79	.....	br. m	....do	
272	....do	25 14 00	173 40 00	3,221	79	78	.....	br. m	....do	
273	....do	25 11 00	173 30 15	3,258	78	78	.....	br. m	....do	
274	....do	25 08 00	173 20 15	3,199	78	77	35	br. m	....do	
275	....do	25 05 00	173 10 30	3,209	78	77	.....	br. m	....do	
276	June 1	25 02 00	173 00 45	3,225	78	78	35	br. m	....do	
277	....do	24 59 00	172 50 45	3,232	77	78	.....	br. m	....do	
278	....do	24 56 00	172 40 30	3,250	78	77	35	br. m	....do	
279	....do	24 53 00	172 30 45	3,230	78	78	.....	br. m	....do	
280	....do	24 50 00	172 21 30	3,199	78	78	35	br. m	....do	
281	....do	24 47 00	172 12 45	3,230	78	78	.....	br. m	....do	
282	....do	24 43 00	172 02 45	3,199	78	78	.....	br. m	....do	
283	....do	24 39 00	171 52 30	3,240	76	78	35	br. m	....do	
284	....do	24 36 00	171 42 45	3,245	76	77	.....	br. m	....do	
285	June 2	24 32 00	171 33 15	3,089	75	78	35	br. m. and r	....do	Manganese concretions.
286	....do	24 31 00	171 31 15	3,187	76	78	.....	br. m	....do	
287	....do	24 27 00	171 21 15	3,250	75	77	.....	br. m	....do	
288	....do	24 22 00	171 12 00	3,334	74	78	.....			
289	....do	24 18 00	171 03 00	3,339	73	78	.....	br. m	Red clay	
290	....do	24 17 00	170 59 45	3,247	77	78	.....	br. m	....do	
291	....do	24 12 00	170 50 15	3,275	74	77	.....	br. m	....do	
292	....do	24 06 00	170 39 45	3,253	74	78	.....	br. m	....do	
293	....do	24 01 00	170 28 45	3,296	76	77	.....	br. m	....do	
294	June 3	23 45 00	170 18 45	3,313	73	76	.....	br. m	....do	
295	....do	23 49 00	170 07 00	3,274	74	76	.....	br. m	....do	
296	....do	23 44 00	169 56 30	3,291	73	78	.....	br. m	....do	
297	....do	23 39 00	169 46 15	3,382	75	78	.....	br. m	....do	
298	....do	23 34 00	169 36 30	3,313	75	78	.....	br. m	....do	
299	....do	23 29 00	169 26 45	3,254	75	78	.....			
300	....do	23 25 00	169 16 45	3,272	73	79	.....	br. m	Red clay	
301	....do	23 20 00	169 07 15	3,242	76	75	.....	br. m	....do	
302	June 4	23 16 00	168 57 30	3,207	75	77	.....	br. m	....do	
303	....do	23 11 00	168 48 00	3,207	76	79	.....	br. m	....do	
304	....do	23 07 00	168 38 15	3,176	76	79	.....	br. m	....do	
305	....do	23 02 00	168 28 30	3,214	79	79	.....	lost	....do	
306	....do	22 57 00	168 18 15	3,285	78	78	.....	br. m	....do	
307	....do	22 54 00	168 08 30	3,275	76	78	.....	br. m	....do	
308	....do	22 51 00	167 57 50	3,381	77	78	.....			
309	....do	22 48 00	167 47 15	2,992	76	78	.....	lost	Red clay	
310	June 5	22 44 00	167 36 30	3,217	76	78	.....	br. m	....do	
311	....do	22 41 00	167 25 30	3,248	78	78	.....	br. m	....do	
312	....do	22 37 00	167 14 15	3,196	80	79	38.4	br. m	....do	
313	....do	22 34 00	167 03 30	3,199	85	79	.....	br. m	....do	
314	....do	22 30 00	166 51 30	3,237	87	79	35	br. m	....do	Fragments of coscinodiscus rex.
315	....do	22 27 00	166 40 00	3,261	81	79	.....	br. m	....do	
316	....do	22 25 00	166 28 30	3,261	78	79	35	.....	.....	

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
317	June 5	22 23 00	166 17 15	3,331	79	79	.....	br. m.....	Red clay...	
318	June 6	22 20 00	166 06 30	3,193	77	78	35	br. m.....	....do.....	
319	....do...	22 18 00	165 55 00	3,139	77	78	.....	br. m.....	....do.....	
320	....do...	22 16 00	165 43 00	3,170	79	78	35	br. m.....	....do.....	
321	....do...	22 14 00	165 31 30	3,261	79	79	.....	br. m.....	....do.....	
322	....do...	22 12 00	165 19 30	3,121	78	79	35	br. m.....	....do.....	
323	....do...	22 08 00	165 08 15	3,046	82	79	.....	br. m.....	....do.....	
324	....do...	22 05 00	164 56 00	3,024	80	79	35	br. m.....	....do.....	
325	....do...	22 01 00	164 45 50	2,986	79	79	.....	br. m.....	....do.....	
326	....do...	21 59 00	164 43 00	3,021	78	79	.....	br. m.....	....do.....	
327	....do...	21 56 00	164 33 30	3,036	77	78	35	br. m.....	....do.....	
328	June 7	21 52 00	164 24 00	3,012	79	79	.....	br. m. fn. spk	....do.....	
329	....do...	21 48 00	164 15 00	2,993	77	79	35	br. m. fn. and crs. sp.	....do.....	
330	....do...	21 45 00	164 06 45	2,993	79	80	.....	br. m. fn. and crs. sp.	....do.....	
331	....do...	21 44 00	164 04 00	2,997	80	81	.....	br. m.....	....do.....	
332	....do...	21 39 00	163 54 45	2,988	77	80	35	br. m. blk. sp.	....do.....	Phillipsite crystals.
333	....do...	21 35 00	163 45 15	2,965	78	80	.....	br. m.....	....do.....	
334	....do...	21 32 00	163 35 30	2,902	76	80	35	br. m. fn. and crs. sp.	....do.....	
335	....do...	21 31 00	163 33 45	2,845	78	80	.....	br. m. fn. and crs. sp.	....do.....	
336	....do...	21 27 00	163 23 45	2,424	79	80	.....	br. m. r.....	....do.....	Foraminifera.
337	....do...	21 26 00	163 21 30	2,287	79	80	.....	br. m. r	....do.....	
338	....do...	21 26 00	163 19 30	2,128	79	80	35	br. m. r.....	Globigerina ooze.	Large, manganese concretions.
339	....do...	21 25 00	163 17 15	1,842	79	79	.....	co. s.....	....do.....	Do.
340	....do....	21 24 00	163 15 00	1,447	76	78	.....	crs. co. s. bk. sp.	....do.....	Do.
341	....do...	21 24 00	163 14 15	1,315	76	78	.....	.....	.....	No specimen.
342	....do...	21 24 00	163 13 15	1,380	77	78	.....	.....	.....	Do.
343	June 8	21 23 00	163 11 15	1,298	77	78	.....	co. s. bk. sp ..	Globigerina ooze.	
344	....do...	21 23 00	163 10 15	1,228	77	78	.....	.....	.....	Do.
345	....do...	21 22 00	163 09 10	1,173	78	78	.....	crs. co. s. bk. sp.	Globigerina ooze.	
346	....do...	21 22 00	163 08 00	1,211	78	79	.....	crs. co. s.....	....do.....	
347	....do...	21 21 00	163 07 00	1,215	78	79	.....	.....	.....	Do.
348	....do...	21 21 00	163 04 45	1,606	78	79	.....	crs. co. s.....	Globigerina ooze.	
349	....do...	21 19 00	162 59 00	1,966	78	79	.....	fn. co. s. br. m. fn. sp.	....do.....	
350	....do...	21 15 00	162 48 30	2,240	80	81	35	br. m. co. s. r.	Red clay...	Fragments of Coscinodiscus rex.
351	....do...	21 14 00	162 46 15	2,270	82	81	.....	.....	.....	No specimen.
352	....do...	21 12 00	162 39 45	2,568	87	81	.....	br. m. crs. sp.	Red clay...	
353	....do...	21 10 00	162 34 45	2,825	77	81	.....	br. m. crs. sp.	....do.....	
354	....do...	21 06 00	162 23 45	2,836	82	81	35	br. m. crs. sp. r.	....do.....	
355	....do...	21 02 00	162 12 45	2,889	79	81	.....	br. m. crs. sp.	....do.....	
356	....do...	20 57 00	162 00 30	2,897	78	80	35	br. m. fn. sp .	....do.....	
357	....do...	20 52 00	161 48 00	2,885	78	80	.....	br. m. fn. sp .	....do.....	
358	June 9	20 48 00	161 35 15	2,890	78	79	35	br. m. fn. sp .	....do.....	
359	....do...	20 43 00	161 22 00	2,659	77	80	.....	br. m. fn. sp .	....do.....	
360	....do...	20 41 00	161 18 00	2,539	78	80	.....	br. m. crs. sp.	....do.....	
361	....do...	20 38 00	161 11 15	2,268	75	81	.....	br. m. fn. co. s.	....do.....	Few foraminifera.
362	....do...	20 36 00	161 05 15	1,937	76	81	.....	co. s. and g ..	Globigerina ooze.	Typical.
363	....do...	20 35 00	161 02 15	1,492	78	81	35.3	crs. co. s. and g.	....do.....	
364	....do...	20 32 00	161 02 00	1,723	81	81	.....	crs. co. s. and g.	....do.....	
365	....do...	20 28 00	161 01 30	1,601	82	81	.....	crs. co. s.....	....do.....	
366	....do...	20 27 00	160 57 45	1,511	82	81	.....	crs. co. s.....	....do.....	
367	....do...	20 26 00	160 54 00	1,251	81	80	.....	Traces of r ..	....do.....	
368	....do...	20 26 00	160 51 45	1,013	82	82	36.4	Traces of r and s.	....do.....	
369	....do...	20 25 00	160 49 45	966	81	81	.....	crs. co. s.....	....do.....	
370	....do...	20 23 00	160 59 30	1,615	79	81	.....	.....	.....	No specimen.
371	....do...	20 21 00	160 59 15	1,617	81	81	.....	.....	.....	Do.

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
372	June 9	20 18 00	160 58 45	1,738	80	81	.....	fn. co. s.....	Globigerina ooze.	
373	....do...	20 12 00	160 58 15	2,153	79	80	.....	br. m. co. s. r.	Red clay...	Manganese.
374	....do...	20 07 00	160 56 15	2,457	80	81	.....	br. m. and r.	.....do.....	
375	....do...	20 03 00	160 52 45	2,509	80	80	.....	br. m. and r.	.....do.....	
376	June 10	19 58 00	160 48 00	2,780	79	80	.....	br. m. and r.	.....do.....	
377	....do...	19 52 00	160 38 45	2,611	79	80	.....	br. m. and r.	.....do.....	
378	....do...	19 50 00	160 36 45	2,420	79	80	.....	br. m. and r.	.....do.....	
379	....do...	19 44 00	160 33 15	2,203	80	80	35	br. m. and r.	.....do.....	No specimen.
380	....do...	19 38 00	160 32 15	2,124	78	80	.....	.....	.....	Do.
381	....do...	19 38 00	160 30 15	1,846	78	80	.....	.....	.....	
382	....do...	19 38 00	160 28 10	1,487	79	81	.....	co. s.....	Globigerina ooze.	
383	....do...	19 37 00	160 25 45	1,307	79	81	.....	fn. co. s.....	.....do.....	
384	....do...	19 37 00	160 23 15	747	79	81	.....	co. s. and r ..	.....do.....	Manganese.
385	....do...	19 37 00	160 21 45	720	79	81	37.9	crs. co. s	.....do.....	
386	....do...	19 35 00	160 31 45	2,084	79	81	.....	co. s. br. m. r.	.....do.....	
387	....do...	19 27 00	160 31 15	2,152	80	81	35	co. s. br. m. r..	.....do.....	
388	....do...	19 22 00	160 29 30	2,415	80	79	.....	gy. br. m. r ..	Red clay ..	
389	....do...	19 14 00	160 25 15	2,823	79	79	35	gy. br. m	.....do.....	
390	....do...	19 10 00	160 21 45	3,006	80	79	.....	gy. br. m. r ..	.....do.....	
391	June 11	19 04 00	160 13 00	3,102	80	79	35	br. m.....	.....do.....	
392	....do...	18 57 00	160 05 15	3,121	80	79	.....	br. m.....	.....do.....	
393	....do...	18 51 00	159 56 15	3,167	81	80	35	br. m.....	.....do.....	
394	....do...	18 49 00	159 50 15	3,144	82	81	.....	br. m.....	.....do.....	
395	....do...	18 49 00	159 44 30	3,150	83	82	.....	br. m.....	.....do.....	
396	....do...	18 48 30	159 35 30	3,151	81	82	35	br. m.....	.....do.....	
397	....do...	18 46 00	159 24 30	3,159	82	82	.....	br. m.....	.....do.....	
398	....do...	18 44 00	159 14 00	3,159	80	82	35.1	br. m.....	.....do.....	
399	....do...	18 42 00	159 03 30	3,159	79	82	.....	br. m.....	.....do.....	
400	....do...	18 39 00	158 52 30	3,159	80	82	35	br. m.....	.....do.....	
401	....do...	18 37 00	158 42 00	3,151	80	81	.....	br. m.....	.....do.....	
402	....do...	18 34 00	158 31 00	3,165	80	81	35	br. m.....	.....do.....	
403	....do...	18 32 00	158 20 30	3,202	80	81	.....	br. m.....	.....do.....	
404	....do...	18 30 00	158 10 00	3,168	82	82	35	br. m.....	.....do.....	
405	June 12	18 27 00	157 59 00	3,173	84	82	.....	br. m.....	.....do.....	
406	....do...	18 25 00	157 48 15	3,169	85	82	35	br. m.....	.....do.....	
407	....do...	18 22 00	157 37 00	3,178	83	82	.....	br. m.....	.....do.....	
408	....do...	18 19 00	157 27 30	3,151	83	82	.....	lost	.....	No specimen.
409	....do...	18 17 00	157 18 00	3,129	81	82	.....	br. m.....	Red clay ..	
410	June 13	18 14 00	157 08 00	3,159	81	82	.....	br. m.....	.....do.....	
411	....do...	18 12 00	156 58 00	3,188	80	81	35	br. m.....	.....do.....	
412	....do...	18 09 00	156 48 15	3,199	80	82	.....	br. m.....	.....do.....	
413	....do...	18 06 00	156 38 30	3,183	83	82	.....	br. m.....	.....do.....	
414	....do...	18 03 00	156 28 45	3,243	84	82	.....	br. m.....	.....do.....	
415	....do...	18 01 00	156 20 30	3,220	88	82	35	br. m.....	.....do.....	
416	....do...	17 57 00	156 10 30	3,183	84	82	.....	br. c.....	.....do.....	
417	....do...	17 53 00	156 00 15	3,136	81	81	35	br. c.....	.....do.....	
418	....do...	17 49 00	155 50 00	3,201	82	81	.....	br. m.....	.....do.....	
419	....do...	17 45 00	155 39 30	3,222	81	81	35	br. m. fn. sp .	.....do.....	
420	June 14	17 41 00	155 29 15	3,146	82	81	.....	br. m. fn. sp .	.....do.....	
421	....do...	17 39 00	155 23 45	3,155	83	81	.....	br. m.....	.....do.....	
422	....do...	17 36 00	155 13 45	3,118	82	81	37.8	br. m	.....do.....	
423	....do...	17 32 00	155 03 30	3,116	84	83	.....	br. m	.....do.....	
424	....do...	17 28 00	154 52 45	3,029	87	83	34.9	br. m. fn. sp.	.....do.....	
425	....do...	17 27 00	154 46 30	2,913	88	83	.....	br. m. fn. sp.	.....do.....	
426	....do...	17 26 00	154 39 45	2,514	89	83	.....	br. m. fn. sp.	.....do.....	
427	....do...	17 24 00	154 33 30	1,997	82	83	.....	co. s. g	Globigerina ooze.	
428	....do...	17 24 00	154 30 15	1,469	81	82	35.4	.....	.....	Do.
429	....do...	17 24 00	154 27 45	2,090	81	82	.....	.....	.....	
430	....do...	17 24 00	154 38 15	2,292	80	81	34.9	r	.....	A manganese nodule.
431	June 15	17 24 00	154 43 15	2,893	81	81	.....	br. m. crs. sp.	Red clay...	
432	....do...	17 18 00	154 43 15	2,921	79	81	.....	br. m. fn. sp .	.....do.....	
433	....do...	17 12 00	154 42 30	2,947	79	81	35	br. m. fn. sp .	.....do.....	
434	....do...	17 08 00	154 40 00	2,796	82	82	.....	br. c. fn. sp..	.....do.....	
435	....do...	17 05 00	154 36 15	2,638	83	82	.....	br. c. crs. sp .	.....do.....	
436	....do...	17 02 00	154 32 00	2,346	84	83	.....	.....	.....	No specimen.
437	....do...	16 59 00	154 28 30	1,593	83	83	.....	fn. co. s	Globigerina ooze.	
438	....do...	16 58 00	154 27 45	1,161	83	83	.....	.....	.....	Do.
439	....do...	17 07 00	154 30 30	2,241	81	82	34.9	br. m. co. s..	.....	Do.
440	....do...	17 15 00	154 34 45	2,598	86	82	.....	br. m. fn. sp.	Red clay ..	
441	....do...	17 23 00	154 38 45	2,870	80	81	.....	br. m. fn. sp.	.....do.....	

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
442	June 15	17 29 00	154 37 45	2,320	80	80	35	br. m. fn. co. s	Globigerina ooze.	
443	June 16	17 34 00	154 36 45	2,982	80	80	.....	br. m. fn. sp.	Red clay ..	
444	....do ...	17 39 00	154 34 30	3,047	80	80	34.9	br. m. fn. sp.	.....do	
445	....do ...	17 43 00	154 29 45	3,041	80	80	.....	br. m. fn. sp.	.....do	
446	....do ...	17 45 00	154 24 15	3,036	81	82	.....	br. m. fn. sp.	.....do	
447	....do ...	17 45 00	154 17 30	3,058	84	82	36.3	br. c. fn. sp .	.....do	
448	....do ...	17 43 00	154 05 15	3,110	84	83	.....	br. m. fn. sp.		
449	....do ...	17 42 00	154 01 15	3,129	87	83	36	br. m. fn. sp. r.	.....do ....do	
450	....do ...	17 39 00	153 50 15	3,154	86	83	.....	br. m. fn. sp.	.....do	
451	....do ...	17 35 00	153 39 30	3,158	84	82	35.8	br. m. fn. sp.	.....do	
452	....do ...	17 32 00	153 28 45	3,067	82	82	.....	br. c. fn. sp .	.....do	
453	....do ...	17 29 00	153 17 45	2,363	81	82	35	br. m. fn. sp.	.....do	
454	....do ...	17 34 00	153 16 45	2,375	81	82	.....	br. m. crs. sp.	.....do	
455	June 17	17 38 00	153 16 15	2,446	80	80	.....	.....	.....	No specimen.
456	....do ...	17 29 00	153 19 45	2,466	79	80	35	br. m. fn. sp.	Red clay ..	
457	....do ...	17 24 00	153 18 45	2,353	80	81	.....	br. m. crs. sp.	.....do	
458	....do ...	17 22 00	153 13 45	1,466	82	82	35.8	co. s.....	Globigerina ooze.	
459	....do ...	17 22 00	153 11 15	709	81	82	.....	.....	.....	Do.
460	....do ...	17 21 00	153 10 00	689	81	82	.....	fn. co. s	Globigerina ooze.	
461	....do ...	17 21 00	153 08 45	711	81	82	.....	crs. co. s	.....do	
462	....do ...	17 26 00	153 07 45	721	83	83	38.6	crs. co. s	.....do	
463	....do ...	17 31 00	153 06 45	1,913	80	82	.....	co. s. and r.....	.....do	
464	....do ...	17 42 00	153 05 15	2,156	80	82	36	.....	.....	Do.
465	....do ...	17 47 00	153 04 00	2,284	84	82	.....	br. m. and fn. co. s.	Globigerina ooze.	
466	....do ...	17 44 00	152 59 30	2,441	85	82	.....	br. m. fn. sp..	.....do	
467	....do ...	17 41 00	153 06 30	2,060	80	82	.....	y. m. co. s. r .	.....do	Spherules of phillipsite in great number.
468	....do ...	17 40 00	153 08 15	1,989	81	82	.....	co. s.....	.....do	
469	....do ...	17 39 00	153 10 30	2,050	81	82	34.9	br. m. co. s...	.....do	
		17 41 00	152 58 00	2,004	80	82	.....	br. m. fn. sp.	Red clay...	
470	....do ...	17 39 00	152 51 45	2,325	81	82	.....	br. m. co. s...	.....do	
471	....do ...	17 36 00	152 45 45	2,000	80	81	35	.....	.....	No specimen.
472	June 18	17 33 00	152 40 00	1,679	79	81	.....	co. s. bk. sp..	Globigerina ooze.	
473	....do ...									
474	....do ...	17 33 00	152 35 45	1,159	79	81	.....	.....	.....	Do.
475	....do ...	17 33 00	152 34 15	1,309	79	79	.....	crs. co. s	Globigerina ooze.	
476	....do ...	17 38 00	152 33 15	1,885	82	80	.....	.....	.....	Do.
477	....do ...	17 36 00	152 28 15	2,609	83	82	38.8	br. m. and r .	Red clay...	
478	....do ...	17 36 00	152 23 00	2,708	81	82	.....	br. m. fn. sp.	.....do	
479	....do ...	17 40 00	152 24 15	2,761	85	83	44.5	br. m. fn. and crs. sp.	.....do	
480	....do ...	17 43 00	152 24 45	2,662	81	83	.....	br. m. fn. sp.	.....do	
481	....do ...	17 47 00	152 25 30	2,785	85	83	.....	br. m. fn. sp.	.....do	
482	....do ...	17 48 00	152 30 00	2,778	81	83	35.8	br. m. fn. sp.	.....do	
483	....do ...	17 50 00	152 39 45	1,871	81	82	.....	crs. co. s	Globigerina ooze.	
484	....do ...	17 51 00	152 44 30	2,371	81	82	.....	br. m. fn. sp. and r.	Red clay...	
485	....do ...	17 51 00	152 55 30	2,741	80	81	35.2	br. m. fn. sp.	.....do	
486	June 19	17 51 00	153 06 30	2,506	81	82	.....	br. m. fn. sp.	.....do	
487	....do ...	17 45 00	153 16 15	2,615	80	81	35.9	br. m. fn. sp.	.....do	
488	....do ...	17 39 00	153 26 30	3,015	82	83	.....	.....	.....	Do.
489	....do ...	17 34 00	153 36 15	3,148	82	83	40.2	br. m. fn. sp.	Red clay...	
490	....do ...	17 29 00	153 36 45	3,163	88	83	.....	br. m. fn. sp.	.....do	
491	....do ...	17 23 00	153 35 45	3,181	88	83	35.2	.....	.....	Do.
492	....do ...	17 19 00	153 35 30	3,168	87	83	.....	.....	.....	Do.
493	....do ...	17 13 00	153 35 00	3,206	82	83	.....	.....	.....	Do.
494	....do ...	17 07 00	153 33 15	3,189	82	82	.....	br. m. fn. sp.	Red clay...	
495	....do ...	16 57 00	153 29 30	3,204	83	81	35	br. m. crs. sp.	.....do	
496	June 20	16 52 00	153 27 50	3,204	83	82	.....	br. m. crs. sp.	.....do	
497	....do ...	16 44 00	153 22 00	3,190	82	82	35	br. m. fn. g ..	.....do	
498	....do ...	16 35 00	153 16 00	3,185	82	82	.....	br. m. fn. g ..	.....do	
499	....do ...	16 28 00	153 08 00	3,192	81	82	35	br. m. fn. g ..	.....do	
500	....do ...	16 22 00	152 59 15	3,193	88	83	.....	br. m. fn. sp.	.....do	
501	....do ...	16 18 00	152 51 00	3,206	87	83	37.4	br. m. fn. sp.	.....do	
502	....do ...	16 15 00	152 39 50	3,211	92	84	.....	br. m. fn. sp.	.....do	
503	....do ...	16 12 00	152 29 00	3,225	86	83	.....	br. m. fn. sp.	.....do	

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
504	June 20	16 09 00	152 18 15	3,227	83	82	.....	.....	.....	No specimen.
505	....do...	16 06 00	152 07 45	2,838	83	82	35	br. m. fn. sp. r.	Red clay...	
506	....do...	16 04 00	152 02 45	2,169	83	82	.....	fn. co. s. r...	Globigerina ooze.	
507	June 21	16 08 00	152 00 45	2,372	82	82	.....	....	.....	Do.
508	....do...	16 11 00	151 58 45	2,399	83	82	.....	r	.....	Do.
509	....do...	16 16 00	152 01 30	2,680	81	83	34.9	....	.....	Do.
510	....do...	15 55 00	152 03 00	2,658	82	83	.....	....	.....	Do.
511	....do...	15 50 00	152 04 30	2,003	83	83	.....	crs. co. s	.....	Do.
512	....do...	15 51 00	152 00 00	2,368	81	83	.....	br. m. r	Red clay...	Manganese.
513	....do...	15 53 00	151 55 30	2,702	84	83	34.8	br. m. fn. sp.	.....do	
514	....do...	15 53 00	151 52 15	2,893	87	83	.....	br. m. fn. sp.	.....do	
515	....do...	15 50 00	151 45 45	3,030	89	84	.....	....	.....	No specimen.
516	....do...	15 47 00	151 35 30	3,252	85	84	35	br. m. fn. sp.	Red clay...	
517	....do...	15 44 00	151 26 00	3,322	84	83	.....	br. m. fn. sp.	.....do	
518	....do...	15 41 00	151 16 45	3,377	81	82	35	br. m. fn. sp.	.....do	
519	June 22	15 38 00	151 07 30	3,273	83	82	.....	br. m. fn. sp.	.....do	
520	....do...	15 35 00	150 58 30	3,262	82	82	35	br. m. fn. sp.	.....do	
521	....do...	15 31 00	150 48 30	3,356	82	82	.....	br. m. fn. sp.	.....do	
522	....do...	15 28 00	150 38 30	3,284	85	83	35	br. m. fn. sp.	.....do	
523	....do...	15 25 00	150 28 30	3,201	88	83	.....	br. m. crs. sp.	.....do	
524	....do...	15 22 00	150 19 30	3,204	88	84	35	br. m. crs. sp.	.....do	
525	....do...	15 18 00	150 10 00	3,211	88	83	.....	br. m. crs. sp.	.....do	
526	....do...	15 14 00	149 58 45	3,190	84	83	35	br. m. and g.	.....do	
527	....do...	15 10 00	149 48 30	3,231	84	83	.....	.....	.....	Do.
528	....do...	15 06 00	149 37 15	3,120	83	83	35	.....	.....	Do.
529	June 23	15 02 00	149 28 00	3,175	82	83	.....	br. m. and g.	Red clay...	
530	....do...	14 57 00	149 17 00	3,118	83	82	35	br. m. and g.	.....do	
531	....do...	14 53 00	149 07 15	3,105	82	83	.....	.....	.....	Do.
532	....do...	14 48 00	148 57 15	3,087	85	83	35	.....	.....	Do.
533	....do...	14 44 00	148 48 45	3,087	90	84	.....	br. m. and g.	Red clay...	
534	....do...	14 41 00	148 41 00	3,139	84	84	35	br. m. and g.	.....do	
535	....do...	14 36 00	148 30 00	3,056	82	84	.....	br. m. and g.	.....do	
536	....do...	14 35 00	148 26 15	2,963	84	84	.....	br. m. and g.	.....do	
537	....do...	14 33 00	148 20 15	3,154	84	83	35	br. m. and r.	.....do	
538	....do...	14 29 00	148 10 30	3,098	82	83	.....	br. m. and r.	.....do	
539	....do...	14 28 00	148 07 45	2,774	81	83	.....	.....	.....	Do.
540	June 24	14 24 00	147 57 30	1,888	80	82	35	.....	.....	Do.
541	....do...	14 23 00	147 55 15	1,846	81	83	.....	fn. co. s	Globigerina ooze.	
542	....do...	14 25 00	147 59 00	1,996	81	82	.....	fn. co. s	.....do	
543	....do...	14 29 00	147 59 45	1,870	81	82	.....	....	.....	Do.
544	....do...	14 33 00	148 00 15	1,946	80	83	34.9	crs. co. s. and g.	Globigerina ooze.	
545	....do...	14 21 00	148 03 00	1,996	81	83	.....	....	.....	Do.
546	....do...	14 16 00	148 03 45	2,414	80	84	35	crs. sp. s. and g.	.....	Do.
547	....do...	14 13 00	148 03 45	2,689	87	84	.....	y. m. bk. sh. s.	Volcanic mud.	
548	....do...	14 15 00	148 06 45	3,183	85	84	.....	br. m. crs. sh. s.	Red clay...	
549	....do...	14 10 00	147 58 15	1,982	87	84	.....	....	.....	Do.
550	....do...	14 08 00	148 03 15	2,975	82	84	35	br. m. and st.	Red clay...	
551	....do...	14 04 00	148 01 45	3,017	84	84	.....	br. m. and st.	.....do	
552	....do...	14 00 00	147 59 15	2,930	81	84	.....	br. m. fn. sp.	.....do	
553	....do...	13 56 00	147 57 15	2,712	81	84	.....	br. m. fn. sp.	.....do	
554	....do...	13 52 00	147 56 00	3,128	81	84	.....	br. m. fn. sp.	.....do	
555	June 25	13 50 00	147 53 45	3,154	84	82	.....	br. m. fn. sp.	.....do	
556	....do...	13 47 00	147 49 30	3,211	83	82	35	br. m. bk. sh. s.	.....do	
557	....do...	13 46 00	147 44 00	3,267	83	82	.....	br. m. bk. sh. s.	.....do	
558	....do...	13 46 00	147 33 30	3,457	83	83	35.1	....	.....	Do.
559	....do...	13 45 00	147 22 45	3,658	90	84	.....	br. m.....	Diatom ooze.	
560	....do...	13 45 00	147 12 15	2,558	88	85	.....	co. s. and r...	Red clay...	
561	....do...	13 53 00	147 18 45	3,843	85	85	35.4	....	.....	Do.
562	....do...	13 42 00	147 25 45	3,945	83	85	.....	br. m. sh. s..	Red clay...	
563	....do...	13 38 00	147 24 00	3,506	82	85	34.1	....	.....	Do.
564	....do...	13 33 00	147 23 00	3,461	83	85	.....	br. m. sh. s..	Red clay...	
565	....do...	13 28 00	147 22 15	3,423	83	84	.....	br. m. crs. sh. s.	.....do	
566	June 26	13 23 00	147 20 00	3,389	82	83	.....	br. m. crs. sh. s.	.....do	
567	....do...	13 18 00	147 16 45	3,379	82	83	.....	br. m. crs. sh. s.	.....do	

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
568	June 26	13 14 00	147 13 45	3,379	83	82	.....	br. m. crs. sp	Red clay...	
569	....do...	13 14 00	147 08 15	3,190	86	83	35	br. m. crs. sh. s.	.....do.....	
570	....do...	13 14 00	147 02 15	3,057	86	84	.....	br. m. and p	.....do.....	
571	....do...	13 14 00	146 56 30	3,288	89	85	.....	.....	.....	No specimen.
572	....do...	13 13 30	146 50 45	4,085	90	85	35.4	.....	Red clay...	
573	....do...	13 24 00	146 49 45	4,547	86	85	.....	.....	.....	Do.
574	....do...	13 34 00	146 50 45	4,913	82	83	.....	.....	.....	Do.
575	June 27	13 45 00	146 51 30	4,563	82	83	.....	br. m. crs. sp.	Red clay...	
576	....do...	13 55 00	146 52 30	4,490	82	84	.....	br. m. and st.	.....do.....	
577	....do...	14 05 00	146 53 45	3,897	82	85	.....	gy. m. fn. s...	.....do.....	
578	....do...	14 08 00	147 03 45	4,563	79	85	.....	gy. m	.....do.....	
579	....do...	14 11 00	147 14 45	4,618	82	85	.....	.....	.....	Do.
580	....do...	14 14 00	147 26 45	3,895	82	83	.....	y. m. crs. sp..	Red clay...	
581	June 28	14 18 00	147 38 45	1,848	82	83	.....	.....	.....	Do.
582	....do...	14 19 00	147 40 45	1,686	82	84	.....	.....	.....	Do.
583	....do...	14 19 00	147 43 15	1,631	83	84	.....	co. s.....	Globigerina ooze.	
584	....do...	14 29 00	147 42 30	1,945	82	84	.....	.....	.....	Do.
585	....do...	14 39 00	147 41 45	2,604	83	84	34.9	br. m. crs. sp.	Red clay...	
586	....do...	14 49 00	147 41 15	3,683	80	83	.....	.....	.....	Do.
587	....do...	14 49 30	147 42 00	3,534	82	84	.....	.....	.....	Do.
588	....do...	14 56 00	147 48 10	3,263	83	84	.....	br. m. crs. s.	Red clay...	
589	....do...	15 06 00	147 46 20	3,150	82	85	.....	.....	.....	Do.
590	....do...	15 15 00	147 40 20	3,607	82	84	.....	.....	.....	Do.
591	June 29	15 25 00	147 38 30	4,204	78	82	.....	br. m. crs. sp.	.....do.....	
592	....do...	15 35 00	147 36 45	3,832	79	84	.....	br. m. fn. sp.	.....do.....	
593	....do...	15 44 30	147 35 00	3,404	83	85	.....	hrd. c. fn. s..	Volcanic mud.	
594	....do...	15 44 00	147 24 30	2,233	85	85	.....	br. m. bk. S	.....do.....	
595	....do...	15 44 00	147 18 45	2,409	89	85	.....	br. m. bk. S	.....do.....	
596	....do...	15 44 00	147 09 00	2,124	88	85	.....	dk. gy. s.....	.....do.....	
597	....do...	15 40 00	146 59 30	2,941	86	85	34.9	bk. s. and br. m.	.....do.....	
598	....do...	15 37 00	146 49 45	3,130	83	85	.....	br. m.....	.....do.....	
599	....do...	15 33 00	146 40 30	2,976	84	85	.....	.....	.....	Do.
600	....do...	15 30 00	146 31 15	2,536	83	84	.....	br. m. co. s..	Volcanic mud.	
601	June 30	15 26 00	146 21 45	2,178	79	84	35	fn. dk. s. sh.	.....do.....	
602	....do...	15 22 00	146 12 30	1,771	81	84	.....	.....	.....	Do.
603	....do...	15 15 00	146 07 30	1,743	81	83	.....	bk. and gy. s.	Volcanic mud.	
604	....do...	15 49 00	147 32 30	2,951	83	84	.....	br. m. and fn. bk. s.	.....do.....	
605	....do...	15 52 00	147 40 30	3,378	83	85	.....	grn. c. and s.	.....do.....	
606	....do...	15 55 00	147 48 30	3,360	83	84	.....	.....	.....	Do.
607	July 1	15 57 00	147 56 00	2,846	83	84	.....	.....	.....	Do.
608	....do...	15 57 00	148 04 00	2,969	82	84	.....	.....	.....	Do.
609	....do...	15 54 00	148 11 15	2,841	83	85	35	br. m. bk. s..	Red clay...	
610	....do...	15 47 00	148 18 08	1,780	87	85	.....	.....	.....	Do.
611	....do...	15 41 00	148 22 15	2,409	83	85	34.9	br. m. bk. s..	.....	Do.
612	....do...	15 33 30	148 27 00	2,369	82	85	.....	bk. and wh. s.	Volcanic sand.	
613	....do...	15 26 00	148 31 15	1,092	82	85	36.1	red and wh. s.	Globigerina ooze.	
614	....do...	15 19 30	148 39 00	3,230	82	84	.....	br. c. bk. s...	Red clay...	
615	....do...	15 11 00	148 38 00	3,178	80	83	.....	br. m.....	.....do.....	
616	....do...	15 01 30	148 37 00	3,077	78	82	.....	br. m. sh.....	.....do.....	
617	July 2	14 53 00	148 36 00	2,987	80	83	35	br. m. sh.....	.....do.....	
618	....do...	15 17 00	148 30 50	2,022	80	84	.....	wh. s. bk. sp.	Globigerina ooze.	
619	....do...	15 15 00	148 27 45	2,414	81	84	.....	.....	.....	Do.
620	....do...	15 11 00	148 27 20	2,567	88	84	.....	wh. s. bk. sp.	.....	Do.
621	....do...	15 13 00	148 23 00	2,555	88	84	.....	br. m. and s.	Red clay...	
622	....do...	15 14 30	148 19 00	2,537	88	85	.....	br. m. and bk. s.	.....do.....	
623	....do...	15 19 00	148 15 00	2,088	85	86	.....	br. m. and bk. s.	Globigerina ooze.	
624	....do...	15 19 00	148 10 30	2,414	87	85	35	br. m. and bk. s.	Red clay...	
625	....do...	15 20 30	148 06 08	2,578	86	85	.....	bk. s. fn. g...	.....do.....	
626	....do...	15 24 00	148 01 30	2,968	77	84	35	.....	.....	Do.
627	....do...	15 29 00	147 58 45	3,158	81	84	.....	.....	.....	Do.
628	....do...	15 38 00	147 54 00	3,381	83	84	35.1	br. m.....	Red clay...	

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
629	July 3	15 46 00	147 49 30	3,302	83	84	.....	br. m.....	Red clay...	
630	....do...	15 46 00	147 29 15	2,339	82	83	35	br. m.....	.....do.....	
631	....do...	15 46 00	147 14 30	2,253	81	84	.....	fn. co. s	Globigerina ooze.	
632	....do...	15 43 00	147 04 50	2,559	83	84	35.3	br. m. bk. s..	Volcanic mud.	
633	....do...	15 19 00	146 16 30	2,052	87	85	35	br. m. bk. s..	.....do.....	
634	....do...	15 10 00	146 15 15	2,154	83	85	.....	bk. s. co. s...	.....do.....	
635	....do...	15 00 00	146 14 15	2,285	83	85	35	bk. s. co. s...	.....do.....	
636	....do...	14 51 00	146 11 08	2,360	82	84	.....	br. m. bk. s ..	.....do.....	
637	....do...	14 41 00	146 06 00	2,352	82	84	35	bk. s. co. s ...	.....do.....	
638	July 4	14 32 00	146 02 00	2,342	81	84	.....	bk. s. br. m ...	.....do.....	
639	....do...	14 22 00	145 57 15	2,297	80	84	35	bk. s. br. m ...	.....do.....	
640	....do...	14 12 00	145 52 40	2,238	81	83	.....	br. m. fn. bk. s.	.....do.....	
641	....do...	14 04 00	145 48 00	2,187	80	83	35	bk. s. co. s ...	....do.....	
642	....do...	13 54 00	145 43 30	2,014	82	84	.....	br. m. bk. s ..	Globigerina ooze.	
643	....do...	13 45 00	145 38 45	1,757	81	85	35	co. s. bk. s ...	.....do.....	
644	....do...	13 39 00	145 29 00	1,483	82	85	.....	.....	.....	No specimen.
645	....do...	13 38 00	145 16 00	1,102	83	86	36	co. s.....	Globigerina ooze.	
646[a]	....do...	13 37 00	145 05 00	648	80	86	.....	co. s.....	.....do.....	
647	....do...	13 32 00	145 02 00	605	80	85	39.6	co. s.....	.....do.....	
648	....do...	13 26 00	144 59 00	720	80	85	.....	fn. co. s	.....do.....	
649	....do...	13 21 00	144 57 00	762	80	85	.....	fn. co. s	.....do.....	
650	....do...	13 16 00	144 54 00	768	80	84	.....	fn. co. s	.....do.....	
651	....do...	13 10 00	144 52 00	907	80	85	37	co. s. bk. s...	.....do.....	
652	....do...	13 05 00	144 50 00	998	79	84	.....	co. s.....	.....do.....	
653	July 5	13 17 30	145 07 00	1,137	80	84	36	fn. co. s	.....do.....	
654	....do...	13 18 30	144 53 00	579	81	84	.....	.....	.....	Do.
655	....do...	13 18 00	144 51 00	480	81	84	.....	.....	.....	Do.
656	....do...	13 18 00	144 49 00	404	82	85	.....	.....	.....	Do.
657	....do...	13 18 00	144 48 00	304	82	85	.....	.....	.....	Do.
658	....do...	13 18 00	144 47 30	208	82	85	.....	.....	.....	Do.
659	....do...	13 18 00	144 47 15	85	82	85	.....	.....	.....	Do.
660	....do...	13 05 00	144 41 00	709	84	85	.....	.....	.....	Do.
661	....do...	13 11 30	144 32 00	812	85	88	37.2	co. s.....	Globigerina ooze.	
662	....do...	13 13 25	144 32 30	1,260	83	88	.....	.....	.....	

GUAM TO LUZON.

663	July 7	13 26 30	144 36 30	457	83	80	.....	co. s. sh. bk. s.	Coral sand.	
664	....do...	13 27 00	144 35 00	1,016	83	85	.....	co. s. wh. s..	Volcanic mud.	
665	....do...	13 27 00	144 25 45	1,652	82	84	35.2	yl. m. co. s ..	.....do.....	
666	....do...	13 27 00	144 23 30	1,693	81	84	.....	co. s. bk. s ..	.....do.....	
667	....do...	13 27 30	144 13 15	2,009	79	84	.....	.....	.....	No specimen.
668	July 8	13 27 30	144 10 30	2,094	81	84	.....	.....	.....	Do.
669	....do...	13 28 00	144 00 00	1,696	82	83	35.2	.....	.....	Do.
670	....do...	13 28 00	143 57 15	1,376	82	83	.....	bk. s	Volcanic mud.	
671	....do...	13 28 00	143 54 45	1,415	82	83	.....	co. s. bk. s ...	.....do.....	
672	....do...	13 28 00	143 52 30	1,820	83	83	.....	br. m. bk. and co. s.	.....do.....	
673	....do...	13 28 20	143 42 45	1,967	82	83	35	lt. br. m. bk. s.	.....do.....	
674	....do...	13 28 30	143 40 20	1,862	82	85	.....	yl. bro. m. bk. s.	.....do.....	
675	....do...	13 29 00	143 29 00	2,007	86	85	.....	yl. bro. m. bk. s.	.....do.....	
676	....do...	13 29 00	143 27 15	1,811	88	86	.....	.....	.....	Do.
677	....do...	13 29 00	143 22 15	1,946	84	86	35.2	yl. br. m. fn. bk. sp.	Volcanic mud.	
678	....do...	13 30 30	143 11 30	1,883	84	86	.....	br. m. fn. bk. sp.	.....do.....	
679	....do...	13 31 00	143 09 00	2,310	84	85	.....	br. m. fn. bk. sp.	.....do.....	
680	....do...	13 32 30	142 57 30	2,010	84	85	.....	br. m. lava ..	.....do.....	Fine glass; much manganese.

[a] Soundings 646 to 662 taken in vicinity of Port Tarafofo, thence to San Luis d'Apra Harbor, Island of Guam.

Abstract of the official record of soundings—Continued.

GUAM TO LUZON—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
681	July 8	13 33 00	142 54 30	2,648	82	84	35.6			No specimen.
682	....do...	13 36 30	142 55 30	2,650	82	84				Do.
683	....do...	13 28 30	142 55 30	2,319	83	84		br. m. fn. bk. sp.	Red clay...	
684	....do...	13 78 30	142 52 15	2,514	83	84		br. m	....do	
685	July 9	13 30 00	142 40 45	2,009	83	85	35.4			Do.
686	....do...	13 30 30	142 37 20	1,586	82	84				Do.
687	....do...	13 31 00	142 33 45	1,553	82	85				Do.
688	....do...	13 31 30	142 30 15	1,346	83	85		bk. and wh. s. lava.	Globigerina ooze.	Manganese.
689	....do...	13 32 00	142 26 45	1,569	82	85		wh. s. bk. sp	....do	
690	....do...	13 33 30	142 15 15	1,863	84	85	35.3			No specimen.
691	....do...	13 34 00	142 12 00	1,841	83	85		yl. m. and s..	Globigerina ooze	
692	....do...	13 35 30	142 00 30	1,739	87	86				Do.
693	....do...	13 36 00	141 57 30	1,977	85	86				Do.
694	....do...	13 37 30	141 47 00	2,332	88	86				Do.
695	....do...	13 38 00	141 44 15	2,349	89	86	36			Do.
696	....do...	13 40 00	141 34 00	2,514	86	86				Do.
697	....do...	13 40 30	141 32 15	2,506	80	85		br. m	Red clay ..	
698	....do...	13 43 00	141 20 45	2,591	82	85	35.2	yl. m. s	....do	
699	....do...	13 43 00	141 18 15	2,632	81	85				Do.
700	July 10	13 46 00	141 08 00	2,663	80	84				Do.
701	....do...	13 46 00	141 05 15	2,691	82	85				Do.
702	....do...	13 49 00	140 55 15	2,691	81	85				Do.
703	....do...	13 49 30	140 52 45	2,710	82	85				Do.
704	....do...	13 52 00	140 43 15	2,740	78	84	35.1	br. m	Red clay ..	
705	....do...	13 54 30	140 33 15	2,710	78	85		br. m	....do	
706	....do...	13 56 00	140 23 15	2,726	75	85	35			Do.
707	....do...	13 58 00	140 13 15	2,726	77	84		br. m	Red clay ..	
708	....do...	14 00 00	140 03 15	2,647	79	84	35	br. m	....do	
709	....do...	14 01 30	139 52 45	2,375	76	84		br. m. fn. sp	....do	
710	....do...	14 02 00	139 50 30	2,231	77	84				Do.
711	....do...	14 03 00	139 45 20	2,317	77	84	35	br. m. crs. sp.	Red clay ..	Do.
712	July 11	14 04 00	139 40 45	2,099	77	84		yl. bro. m	....do	
713	....do...	14 04 00	139 38 15	2,212	81	84				Do.
714	....do...	14 06 00	139 28 30	2,992	81	84	35			Do.
715	....do...	14 08 00	139 17 45	2,639	82	84.5		br. m. fn. and crs. sp.	Red clay ..	
716	....do...	14 08 00	139 14 45	2,596	80	85		br. m. fn. bk. sp.	....do	
717	....do...	14 10 00	139 03 45	2,837	81	85		br. m. fn. bk. sp.	....do	
718	....do...	14 10 00	139 02 00	2,674	83	85		br. m. fn. bk. sp.	....do	
719	....do...	14 12 00	138 54 45	2,705	82	85	67.6	hd. c		Do.
720	....do...	14 13 30	138 47 30	2,374	81	85				Do.
721	....do...	14 14 00	138 45 45	2,519	81	85		br. m. fn. sp..	Red clay...	
722	....do...	14 15 30	138 38 45	2,476	81	84	67	br. m	....do	
723	July 12	14 17 00	138 31 30	2,605	80	84	67			Do.
724	....do...	14 17 30	138 29 30	2,839	82	84		br. m. hd. c ..	Red clay...	
725	....do...	14 19 00	138 23 15	2,596	82	84		br. m. hd. c ..	....do	
726	....do...	14 19 30	138 21 00	2,638	82	84		br. m. hd. c ..	....do	
727	....do...	14 21 00	138 13 30	2,959	84	85				Do.
728	....do...	14 23 00	138 04 00	2,797	84	85				Do.
729	....do...	14 24 00	137 55 00	2,704	83	85		br. m	Red clay...	
730	....do...	14 25 30	137 45 45	2,761	86	84		br. m	....do	
731	....do...	14 27 00	137 36 30	2,782	82	84		br. m	....do	
732	....do...	14 28 00	137 27 45	2,568	79	84		br. m	....do	
733	July 13	14 28 30	137 25 00	2,477	79	84				Do.
734	....do...	14 29 00	137 21 10	2,477	82	84		br. m. bk. sp .	Red clay...	
735	....do...	14 30 00	137 15 30	2,677	80	84		br. m. bk. sp	....do	
736	....do...	14 31 00	137 05 45	2,602	82	84.5		br. m. bk. sp	....do	
737	....do...	14 33 00	136 56 45	2,652	79	85		br. m	....do	
738	....do...	14 34 00	136 48 00	2,870	83	85		br. and yl. m. and c.	....do	
739	....do...	14 33 00	136 40 10	2,862	83	84		br. m	....do	
740	....do...	14 32 00	136 30 15	2,735	82	84		br. c	....do	
741	....do...	14 30 30	136 20 00	2,907	81	83				Do.
742	....do...	14 29 00	136 10 30	3,145	77	83		gy. gn. m	Red clay...	
743	July 14	14 28 00	136 00 15	3,118	77	83		bl. gn. m	Diatom ooze.	
744	....do...	14 26 30	135 50 30	2,879	82	83		gr. gn. m	....do	
745	....do...	14 25 00	135 40 30	2,617	81	84		br. m	Red clay...	
746	....do...	14 24 00	135 31 00	2,788	83	84		br. gn. m	Diatom ooze.	

Abstract of the official record of soundings—Continued.

GUAM TO LUZON—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
747	July 14	14 23 00	135 21 00	2,731	85	85	.....	br. m	Red clay	
748	....do	14 24 00	135 10 10	2,891	82	84	.....	br. m	....do	
749	....do	14 24 30	135 00 45	2,819	82	84	.....	br. m	Diatom ooze.	
750	....do	14 25 00	134 51 30	2,679	82	83	.....	gy. m	....do	
751	July 15	14 25 30	134 42 30	2,679	82	83	.....	br. m	Red clay	
752	....do	14 26 00	134 34 00	2,432	83	83	.....	bl. gn. m	Diatom ooze.	
753	....do	14 26 00	134 31 30	1,913	80	84	.....	br. s	Globigerina ooze.	
754	....do	14 26 00	134 29 15	1,937	80	84	.....	br. c. and s.	....do	
755	....do	14 26 00	134 27 00	1,935	80	84.5	.....	wh. s. br. m	....do	
756	July 24	14 26 00	134 30 45	2,307	81	82	.....	br. m. and s.	....do	
757	....do	14 26 15	134 26 30	2,158	81	82	.....	yl. m. and s.	....do	
758	July 25	14 26 30	134 23 00	1,780	81	84	.....	yl. m. and s	....do	
759	....do	14 26 45	134 20 00	1,657	81	84	.....	yl. m. and s	....do	
760	....do	14 27 00	134 17 00	1,560	81	84	.....	yl. m. and s. bk. sp.	....do	
761	....do	14 27 15	134 13 45	1,619	81	84	.....	sh. s. lava	....do	
762	....do	14 27 40	134 11 00	1,782	80	84	35.2	fn. wh. s. blk. sp.	....do	
763	....do	14 28 00	134 05 30	2,072	85	85	.....	br. m. fn. bk. sp.	Red clay	
764	....do	14 29 00	133 56 15	2,487	82	85	.....	br. m	Diatom ooze.	
765	....do	14 29 45	133 47 00	2,688	83	85	.....	br. m	Red clay	
766	....do	14 30 00	133 40 15	2,799	82	86	.....	br. m	....do	
767	....do	14 31 00	133 33 45	2,827	81	86	35.4	br. m	....do	Diatoms.
768	....do	14 32 00	133 23 00	2,988	86	86	.....	.....	.....	No specimen.
769	....do	14 33 30	133 12 00	2,914	83	85	.....	.....	.....	Do.
770	....do	14 35 00	133 01 00	2,888	81	85	35.3	br. m	Red clay	Do.
771	July 26	14 36 00	132 50 00	2,951	80	84	.....	.....	....do	
772	....do	14 38 00	132 39 00	3,344	82	83	35.8	.....	.....	Do.
773	....do	14 39 00	132 28 00	3,119	81	83	.....	.....	.....	Do.
774	....do	14 41 00	132 17 00	3,029	83	84	35.5	br. c	Red clay	
775	....do	14 42 00	132 06 45	3,423	88	85	.....	br. m	....do	
776	....do	14 43 30	131 55 45	3,283	86	85	.....	br. and gn. m.	Diatom ooze.	
777	....do	14 45 00	131 45 30	3,421	84	85	.....	lt. br. m	Red clay	
778	....do	14 46 00	131 34 45	3,089	85	86	35.5	br. m	....do	
779	....do	14 47 00	131 24 15	3,172	83	85	.....	br. m	....do	
780	....do	14 47 30	131 13 30	3,354	83	85	35.4	br. m	....do	
781	....do	14 48 30	131 03 00	3,252	81	84	.....	wh. and br. m.	Diatom ooze.	
782	....do	14 49 00	130 52 30	3,129	81	84	35.3	br. m	Red clay	
783	....do	14 50 00	130 42 00	3,264	82	83	.....	br. m	....do	
784	July 27	14 50 00	130 31 30	3,547	83	84	35.7	gy. m	Diatom ooze.	
785	....do	14 50 30	130 20 45	3,237	87	85	.....	br. m	Red clay	
786	....do	14 51 00	130 09 45	3,148	88	85	35.6	br. m	....do	
787	....do	14 52 00	129 57 00	3,175	90	86	.....	br. m	....do	
788	....do	14 53 30	129 45 15	3,318	84	86	35.6	br. m	....do	
789	....do	14 55 00	129 34 15	3,041	82	85	.....	br. m	....do	
790	....do	14 56 30	129 23 15	3,119	82	85	32	br. m	....do	
791	....do	14 58 00	129 12 15	3,011	82	84	.....	br. m	....do	
792	....do	15 00 00	129 02 00	3,158	80	84	35.5	br. m. and st.	....do	
793	....do	15 02 00	128 52 00	3,099	81	84	.....	br. m	....do	
794	....do	15 04 30	128 41 40	2,840	82	84	35.5	br. m	....do	
795	....do	15 06 30	128 31 30	3,093	85	86	.....	br. m	....do	
796	....do	15 08 30	128 22 45	2,670	85	86	.....	br. m	....do	
797	....do	15 09 00	128 20 00	2,767	84	86	.....	br. m	....do	
798	....do	15 10 00	128 09 30	3,098	85	86	36	br. m	....do	
799	....do	15 10 00	127 59 15	3,025	86	86	.....	br. m	....do	
800	July 28	15 10 30	127 49 30	3,108	82	85	35.5	br. m. and g.	....do	
801	....do	15 10 00	127 40 45	3,298	82	85	.....	br. m	....do	
802	....do	15 09 30	127 31 40	2,844	82	84	.....	br. m	....do	
803	July 29	15 09 00	127 22 30	2,943	82	84	35.3	br. m	....do	
804	....do	15 08 30	127 13 20	2,995	81	84	.....	br. m	....do	
805	....do	15 08 00	127 04 15	3,026	82	85	35.4	br. m	....do	
806	....do	15 07 00	126 54 45	2,929	83	85	.....	br. m	....do	
807	....do	15 06 00	126 44 45	3,121	86	86	.....	br. m	....do	
808	....do	15 05 00	126 36 30	2,855	85	86	.....	br. m	....do	
809	....do	15 05 30	126 27 00	3,134	84	86	22.9	br. m	....do	
810	....do	15 06 00	126 17 45	3,252	84	86	.....	br. m	....do	
811	....do	15 06 00	126 08 00	3,047	83	86	36	br. m	....do	
812	....do	15 06 00	125 58 00	3,130	83	86	.....	br. m	....do	

Abstract of the official record of soundings—Continued.

GUAM TO LUZON—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	Fathoms.	°	°	°			
813	July 29	15 06 30	125 48 15	2,819	83	86	35.2	br. m.....	Red clay...	
814	July 30	15 07 00	125 38 15	3,144	83	84	.....	br. m.....	.....do.....	
815	....do...	15 07 00	125 28 30	2,792	82	84	.....	lost	.....do.....	
816	....do...	15 08 00	125 18 45	2,936	84	85	.....	br. m.....	.....do.....	
817	....do...	15 08 00	125 08 45	2,911	82	85	.....	br. m.....	.....do.....	
818	....do...	15 08 00	124 58 45	3,182	88	87	.....	lt. br. m.....	.....do.....	
819	....do...	15 08 00	124 54 30	3,116	86	86	35.7	br. m.....	.....do.....	
820	....do...	15 09 00	124 44 00	2,817	87	87	.....	br. c.....	.....do.....	
821	....do...	15 10 00	124 33 30	2,468	83	86	35.4	br. c.....	.....do.....	
822	....do...	15 10 30	124 30 15	2,427	85	86	.....	br. c.....	.....do.....	
823	....do...	15 12 00	124 20 00	2,683	83	85	.....	br. c. and m. and s.	.....do.....	
824	....do...	15 14 00	124 09 20	2,994	83	86	.....	br. c.....	.....do.....	
825	July 31	15 15 00	123 58 45	2,771	82	85	.....	lt. br. m. fn. s.	.....do.....	
826	....do...	15 17 00	123 48 15	2,360	83	85	35.4	br. m. fn. s..	.....do.....	
827	....do...	15 19 00	123 38 00	1,401	82	85	.....	br. m. fn. s..	Blue mud..	
828	....do...	15 20 00	123 34 30	1,390	81	84	.....	br. m. fn. s..	.....do.....	
829	....do...	15 21 00	123 28 45	1,411	82	84	.....	br. m. fn. s..	.....do.....	
830	....do...	15 22 30	123 22 45	1,515	82	85	.....	br. m. fn. s..	.....do.....	
831	....do...	15 25 00	123 10 50	2,100	83	86	35.3	br. m. fn. s..	.....do.....	
832	....do...	15 28 30	122 58 40	2,458	85	86	.....	br. m. fn. s..	.....do.....	
833	....do...	15 30 00	122 51 30	2,740	83	86	35.6	lt. br. m.....	.....do.....	
834	....do...	15 29 30	122 40 45	2,600	85	87	.....	br. m. fn. bk. s.	.....do.....	
835	....do...	15 28 30	122 29 50	2,259	86	87	.....	lt. br. m. fn. bk. sp.	.....do.....	
836	....do...	15 27 00	122 19 45	1,364	86	89	35.6	br. m. and s.	.....do.....	
837	....do...	15 26 00	122 16 15	1,286	84	88	.....	br. m. and s.	.....do.....	
838	....do...	15 25 00	122 12 40	1,406	84	87	.....	br. m. and s.	.....do.....	
839	....do...	15 24 00	122 10 15	1,395	83	87	.....	br. m. and s.	.....do.....	
840	....do...	15 23 00	122 08 00	1,478	84	87	.....	br. m. and s.	.....do.....	
841	....do...	15 22 30	122 05 45	1,498	83	87	.....	gn. c.....	.....do.....	
842	Aug. 1	15 22 00	122 03 30	1,330	83	86	.....	br. m. and s.	Blue mud..	
843	....do...	15 21 00	122 01 15	1,449	88	86	.....	gn. and br. m.	.....do.....	
844	....do...	15 20 00	121 59 15	1,449	89	86	35.8	gn. and br. m.	.....do.....	
845	....do...	15 19 00	121 56 20	1,459	86	86	.....	br. m.....	.....do.....	
846	....do...	15 18 00	121 54 00	1,463	80	86	.....	gn. m	Green mud.	
847	....do...	15 16 30	121 49 15	1,481	81	86	.....	gn. m	.....do.....	
848	....do...	15 16 30	121 44 45	1,101	84	86	.....	gn. m	.....do.....	
849	....do...	15 16 00	121 40 00	737	82	86	.....	gn. m	.....do.....	
850	... do...	15 17 00	121 34 45	157	83	86	.....	gn. m	.....do.....	
851	....do...	15 17 00	121 34 00	134	83	86	.....	gn. m	.....	No specimen.
852	....do...	15 17 15	121 33 00	120	83	86	.....	gn. m	.....	Do.
853	....do...	15 17 30	121 31 45	103	83	86	.....	gn. m	.....	No specimen. Dingala Bay, Luzon Island.

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854	Aug. 19	15 09 00	121 37 30	180	81	83	.....	gr. c.....	.....	
855	....do...	15 26 30	121 47 15	1,599	81	85	.....	gr. br. m	Green mud.	
856	....do...	15 12 00	121 57 30	829	83	85	.....	gr. c.....	.....do.....	
857	....do...	15 31 30	122 08 00	1,046	83	85	.....	gr. c.....	.....do.....	
858	....do...	15 17 00	122 18 15	1,458	82	84	.....	gr. and br. m. bk. sps.	.....do.....	
859	....do...	15 35 00	122 29 00	2,390	79	84	.....	br. m.....	.....do.....	
860	Aug. 20	15 19 15	122 40 15	2,090	80	83	.....	br. m.....	.....do.....	
861	....do...	15 35 15	122 52 45	3,083	79	82	.....	.....	.....	No specimen.
862	....do...	15 16 00	123 03 00	1,550	79	85	.....	br. m.....	Green mud.	
863	....do...	15 30 00	123 17 15	2,424	78	85	.....	br. m.....	.....do.....	
864	....do...	15 12 20	123 25 00	821	81	85	.....	br. m.....	.....do.....	
865	....do...	15 26 30	123 40 30	2,058	82	84	.....	br. m.....	.....	Do.
866	....do...	15 09 45	123 50 30	1,272	81	84	.....	br. m.....	Blue mud..	
867	Aug. 21	15 24 00	124 05 15	2,985	83	84	.....	br. m.....	Red clay...	
868	....do...	15 07 15	124 14 00	2,136	82	83	.....	br. m.....	Green mud.	
869	....do...	15 21 30	124 28 15	2,440	83	85	.....	br. m.....	Red clay...	
870	....do...	15 04 00	124 34 45	3,140	85	85	.....	br. m.....	.....do.....	
871	....do...	15 19 15	124 44 45	2,348	84	86	35.2	br. m.....	.....do.....	
872	....do...	15 01 00	124 53 00	3,260	85	84	.....	br. m.....	.....do.....	
873	....do...	15 19 00	125 04 20	2,920	85	85	35.4	br. m.....	.....do.....	
874	Aug. 22	15 01 30	125 13 00	2,988	83	83	.....	br. m.....	.....do.....	
875	....do...	15 19 15	125 25 15	2,573	85	84	35.4	br. m	.....do.....	
876	....do...	15 01 30	125 36 30	2,541	87	86	.....	br. m.....	.....do.....	

Abstract of the official record of soundings—Continued.

LUZON TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
877	Aug. 22	15 14 30	125 44 30	2,862	89	86	35.4	br. m.....	Red clay...	
878	....do...	14 57 00	125 54 00	2,957	84	86	.....	br. m.....	.....do.....	
879	....do...	15 14 00	126 02 30	2,990	85	85	35.6	br. m.....	.....do.....	
880	Aug. 23	14 55 45	126 10 00	2,961	81	84	.....	br. m.....	.....do.....	
881	....do...	15 13 30	126 19 15	3,312	82	83	.....	br. m.....	.....do.....	
882	....do...	14 55 15	126 27 40	2,946	79	84	35.6	br. m.....	.....do.....	
883	....do...	15 12 45	126 39 00	2,711	81	84	.....	br m.....	.....do.....	
884	....do...	14 57 40	126 47 30	3,310	82	85	35.7	br. m.....	.....do.....	
885	....do...	15 15 45	126 58 40	2,909	81	83	.....	br. m.....	.....do.....	
886	....do...	14 58 15	127 09 15	3,048	82	83	35.6	br. m.....	.....do.....	
887	Aug. 24	15 17 00	127 19 30	2,943	81	84	.....	br. m.....	.....do.....	
888	....do...	14 59 30	127 31 00	3,009	80	84	35.5	br. m.....	.....do.....	
889	....do...	15 17 00	127 40 45	3,006	84	84	.....	br. c.....	.....do.....	
890	....do...	15 00 00	127 54 00	3,014	86	85	35.5	br. m.....	.....do.....	
891	....do...	15 17 45	128 01 30	2,987	90	85	.....	br. m.....	.....do.....	
892	....do...	14 59 15	128 11 45	3,234	83	84	35.7	br. m.....	.....do.....	
893	....do...	15 16 00	128 18 15	3,145	82	84	.....	br. m.....	.....do.....	
894	Aug. 25	14 57 20	128 22 15	2,889	80	83	.....	br. m.....	.....do.....	
895	....do...	15 14 00	128 30 30	3,030	82	84	35.6	br. m.....	.....do.....	
896	....do...	14 52 00	128 37 30	3,342	.....	.....	.....	br. m.....	.....do.....	
897	....do...	15 12 30	128 50 30	3,189	82	85	35.6	br. m.....	.....do.....	
898	....do...	14 58 15	129 01 15	3,346	82	84	.....	br. m.....	.....do.....	
899	Aug. 26	15 10 00	129 16 30	2,864	81	83	35.5	br. m.....	.....do.....	
900	....do...	14 53 00	129 27 40	3,159	.....	.....	.....	br. m.....	.....do.....	
901	....do...	15 11 15	129 37 30	2,781	87	85	35.6	br. m.....	.....do.....	
902	....do...	14 45 40	129 50 00	2,945	88	80	.....	br. m.....	.....do.....	
903	....do...	15 00 00	129 55 30	2,809	83	85	35.5	br. m.....	.....do.....	
904	....do...	14 39 30	130 05 30	3,096	83	83	.....	.....	.....	No specimen.
905	Aug. 27	14 55 00	130 13 00	3,128	80	83	.....	br. m.....	Red clay...	
906	....do...	14 36 00	130 23 00	3,204	80	84	.....	br. m.....	.....do.....	
907	....do...	14 51 30	130 32 30	3,490	86	84	.....	br. m.....	.....do.....	
908	....do...	14 37 30	130 41 30	3,132	88	85	35.8	br. m.....	.....do.....	
909	....do...	14 54 45	130 15 15	3,125	88	86	.....	br. m.....	.....do.....	
910	....do...	14 38 00	131 03 00	2,969	82	85	35.8	br. m.....	.....do.....	
911	....do...	14 56 00	131 14 45	3,295	82	84	.....	br. m.....	.....do.....	
912	Aug. 28	14 40 00	131 26 40	2,985	80	83	35.9	br. m.....	.....do.....	
913	....do...	14 57 30	131 39 00	2,823	81	84	.....	br. m.....	.....do.....	
914	....do...	14 42 15	131 51 45	3,065	83	84	35.5	br. m.....	.....do.....	
915	....do...	14 55 00	132 00 30	3,118	87	85	.....	br. m.....	.....do.....	
916	....do...	14 35 30	132 09 30	3,103	85	85	35.9	br. m.....	.....do.....	
917	....do...	14 49 45	132 20 00	3,246	81	85	.....	br. m.....	.....do.....	
918	....do...	14 32 00	132 26 00	3,253	80	84	35.8	br. m.....	.....do.....	
919	Aug. 29	14 48 45	132 37 20	2,998	79	83	.....	br. m.....	.....do.....	
920	....do...	14 31 15	132 42 30	3,327	80	84	35.8	br. and gy. m.	Diatom ooze	
921	....do...	14 49 15	132 54 00	2,499	86	85	.....	br. m.....	Red clay...	
922	....do...	14 32 00	133 00 30	2,769	88	85	35.6	br. m.....	.....do.....	
923	....do...	14 44 00	133 11 45	2,322	85	86	.....	br. m.....	.....do.....	
924	....do...	14 23 30	133 20 15	2,878	81	85	35.8	br. m.....	.....do.....	
925	....do...	14 39 30	133 32 30	2,905	83	84	.....	br. m.....	.....do.....	
926	Aug. 30	14 20 30	133 41 00	2,851	78	83	35.6	br. m.....	.....do.....	
927	....do...	14 36 30	133 54 00	2,494	79	83	.....	br. m.....	.....do.....	
928	....do...	14 17 00	134 01 45	2,593	83	84	35.7	br. m.....	.....do.....	
929	....do...	14 36 00	134 16 07	1,964	83	85	.....	gy. m. and s.	Globigerina ooze.	
930	....do...	14 17 15	134 23 45	1,850	82	86	35.2	gy. m. and s.	.....do.....	
931	....do...	14 34 00	134 36 00	2,250	82	85	.....	br. m.....	Red clay ..	
932	....do...	14 17 00	134 46 00	2,330	91	83	35.2	br. m.....	.....do.....	
933	Aug. 31	14 36 20	134 58 30	2,488	80	83	.....	br. m.....	.....do.....	
934	....do...	14 20 00	135 09 30	2,652	82	84	35.3	br. m.....	.....do.....	
935	....do...	14 38 00	135 21 00	2,532	83	84	.....	.....	.....	Do.
936	....do...	14 20 30	135 32 00	2,779	84	85	35.5	br. m.....	Red clay ..	
937	....do...	14 37 30	135 40 30	2,620	82	86	.....	br. m.....	.....do.....	
938	....do...	14 20 00	135 51 15	2,862	84	86	35.4	br. m.....	.....do.....	
939	....do...	14 37 40	136 00 00	2,838	84	84	.....	gy. m.....	Diatom ooze	
940	Sept. 1	14 21 00	136 11 40	2,830	83	84	35.4	.....	.....	Do.
941	....do...	14 39 15	136 20 30	2,748	82	83	.....	br. m.....	Red clay ..	
942	....do...	14 23 15	136 32 15	3,001	80	84	35.5	.....	.....	Do.
943	....do...	14 40 30	136 41 00	2,838	89	85	.....	yl. m	Red clay ..	
944	....do...	14 24 00	136 53 00	2,559	87	85	35.2	br. m.....	.....do.....	
945	....do...	14 41 00	137 01 40	2,877	83	85	.....	br. m.....	.....do.....	
946	....do...	14 23 00	137 13 00	2,751	83	84	35.2	br. m.....	.....do.....	
947	Sept. 2	14 40 20	137 24 30	2,605	79	83	.....	br. m.....	.....do.....	
948	....do...	14 22 45	137 35 00	2,762	81	84	35.2	.....	.....	Do.
949	....do...	14 38 00	137 49 00	2,725	83	84	.....	br. c.....	Red clay ..	
950	....do...	14 17 00	137 55 30	2,638	83	85	35.2	.....	.....	Do.

Abstract of the official record of soundings—Continued.

LUZON TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	Fathoms.	°	°	°			
951	Sept. 2	14 31 00	138 07 00	2,556	87	86	.....	r.....	Red clay ..	Manganese concretions.
952	....do...	14 10 00	138 13 45	2,757	83	85	35.1	br. m.....	.....do.....	
953	....do...	14 24 00	138 13 26	2,351	82	84	.....	gvl. br. m. and s.	.....do.....	Manganese.
954	Sept. 3	14 04 15	138 31 15	2,646	82	83	35.2	br. m.....	.....do.....	
955	....do...	14 18 20	138 46 30	2,793	82	85	.....	br. m.....	.....do.....	
956	....do...	13 57 30	138 52 00	2,763	84	86	35.2	br. m.....	.....do.....	
957	....do...	14 12 00	139 08 30	2,473	84	86	.....	.....	.....	No specimen.
958	....do...	13 54 20	139 11 15	2,298	86	86	35.1	br. m. and s.	Red clay ..	
959	....do...	14 13 00	139 26 45	3,180	83	85	.....	wh. m.....	Diatom ooze	
960	....do...	13 54 40	139 34 00	3,042	82	84	36	br.m.fn.bk.sp	.....do.....	
961	Sept. 4	14 10 40	139 47 00	2,187	82	84	.....	.....	.....	Do.
962	....do...	13 51 30	139 54 20	2,767	77	83	37	.....	.....	Do.
963	....do...	14 07 15	140 07 45	2,599	81	86	.....	gvl.....	Red clay ..	Pumice.
964	....do...	13 49 15	140 14 30	2,737	86	86	.....	gvl.....	.....do.....	
965	....do...	14 05 00	140 28 15	2,772	80	84	.....	br. m.....	.....do.....	
966	....do...	13 46 15	140 34 30	2,696	77	83	.....	br. m.....	.....do.....	
967	Sept. 5	14 01 30	140 49 00	2,706	82	84	.....	br. m.....	.....do.....	Radiolaria.
968	....do...	13 43 30	140 55 00	2,658	82	84	.....	br. m.....	.....do.....	
969	....do...	13 58 30	141 09 00	2,673	86	85	.....	br. m.....	.....do.....	
970	....do...	13 38 30	141 16 15	2,567	90	86	.....	br. m.....	.....do.....	
971	....do...	13 51 45	141 29 15	2,587	86	86	.....	br. m.....	.....do.....	
972	....do...	13 30 20	141 34 45	2,352	83	86	35	.....	.....	No specimen.
973	....do...	13 45 15	141 47 20	2,383	82	85	.....	br. m.....	Red clay...	
974	Sept. 6	13 26 40	141 53 45	1,775	78	84	35.1	gy. m. and s.	Globigerina ooze.	
975	....do...	13 41 30	142 06 45	1,865	81	85	.....	gy. fn. s.....	.....do.....	
976	....do...	13 22 30	142 13 15	1,649	82	85	.....	br. m. and s.	.....do.....	
977	....do...	13 38 30	142 24 30	1,755	87	86	.....	gy. s. and m.	.....do.....	
978	....do...	13 21 00	142 32 30	1,380	88	86	.....	wh.and bk. s	.....do.....	
979	....do...	13 41 00	142 46 15	1,740	81	86	.....	.....	.....	Do.
980	....do...	13 23 15	142 56 15	2,200	82	85	.....	br. m.....	Red clay...	
981	Sept. 7	13 41 20	143 08 20	2,364	83	85	35.4	br. m.....	.....do.....	
982	....do...	13 25 00	143 19 00	1,754	82	84	.....	bk.s.and gvl.	Volcanic mud.	Many mang concretions.
983	....do...	13 43 45	143 31 45	1,882	80	84	35.1	bk gvl. bk. s.	.....do.....	Do.
984	....do...	13 26 45	143 42 30	1,751	85	85	.....	brs. bk. and wh. s.	.....do.....	Do.
985	....do...	13 41 45	143 52 30	1,924	86	86	35.1	r.....	.....do.....	Do.
986	Sept. 9	13 34 30	144 31 30	1,411	80	86	.....	bk. and gy. s. gy. m.	.....do.....	
987	....do...	13 37 00	144 14 30	1,889	87	86	.....	fn. gy. m.....	.....	No specimen.
988	....do...	13 20 30	144 00 00	1,606	84	87	.....	bk. s. gy. m..	Volcanic mud.	
989	....do...	13 17 00	144 19 45	1,927	83	87	.....	gy. m	Globigerina ooze.	Guam.

GUAM TO YOKOHAMA.

990	Sept. 9	13 28 30	144 36 15	859	83	87	.....	fn. br. m	Coral sand .	
991	....do...	13 38 30	144 35 00	1,143	81	86	.....	fn. bk. and gy. s.	Globigerina ooze.	
992	....do...	13 40 30	144 34 45	1,013	83	86	.....	r.....	.....do.....	Manganese.
993	....do...	13 45 45	144 34 00	1,970	83	86	.....	r.....	.....do.....	
994	....do...	13 51 00	144 33 15	2,014	82	86	.....	gy. m	Volcanic mud.	Fine volcanic glass.
995	Sept. 10	14 00 45	144 31 45	2,091	83	85	35.2	vol. sand....	.....do.....	
996	....do...	14 02 45	144 31 30	2,005	83	85	.....	br. m. and s.	.....do.....	
997	....do...	14 13 30	144 30 00	2,168	82	84	.....	br. m. and s.	.....do.....	
998	....do...	14 15 40	144 29 45	2,158	82	84	.....	fn. bk. s.....	.....	No specimen.
999	....do...	14 25 30	144 28 30	1,988	84	85	.....	r.....	Volcanic mud.	Manganese.
1000	....do...	14 27 30	144 28 15	1,947	84	86	39	bk. and gy. s. and m.	.....do.....	
1001	....do...	14 37 30	144 27 00	2,005	86	86	.....	bk. and gy. s. and m.	.....do.....	
1002	....do...	14 39 30	144 36 45	1,997	86	86	.....	r.....	.....	No specimen.
1003	....do...	14 49 30	144 25 20	2,233	81	86	36	....	Volcanic mud.	Do.
1004	....do...	14 51 40	144 25 00	2,214	83	86	.....	r.....	.....do.....	Manganese.
1005	....do...	15 00 45	144 23 30	2,061	82	86	.....	r.....	.....do.....	Do.
1006	....do...	15 02 45	144 23 15	1,847	83	86	.....	bk. s. gy. m .	.....do.....	

Abstract of the official record of soundings—Continued.

GUAM TO YOKOHAMA—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1007	Sept. 10	15 09 15	144 22 30	2,128	83	85	.....	br. m. bk. s..	volcanic mud.	
1008	....do...	15 20 15	144 20 45	1,985	81	85	.....	br. m. bk. s..	.....do.....	
1009	....do...	15 22 20	144 20 30	1,959	81	85	37	gvl.....	.....do.....	Pumice and manganese.
1010	....do...	15 33 15	144 18 45	2,082	81	85	.....	br. m. bk. s ..	.....do.....	
1011	....do...	15 35 30	144 18 30	2,273	81	84	.....	br. m.....	.....do.....	
1012	....do...	15 46 30	144 16 45	1,932	81	84	35.1	br. m.....	.....do.....	
1013	Sept. 11	15 48 45	144 16 30	1,917	81	84	.....	br. m.....	.....do.....	
1014	....do...	15 59 45	144 14 45	1,987	81	84	.....	br. m.....	.....do.....	
1015	....do...	16 02 00	144 14 30	2,057	82	84	.....	br. m.....	.....do.....	
1016	....do...	16 13 00	144 12 40	2,375	83	85	.....	br. m.....	.....do.....	
1017	....do...	16 15 30	144 12 20	2,446	84	85	.....	br. m. bk. s ..	.....do.....	
1018	....do...	16 26 00	144 11 00	2,381	83	85	.....	R. br. m	.....do.....	
1019	....do...	16 28 00	144 10 45	2,211	87	86	35.5	br. m.....	.....do.....	
1020	....do...	16 37 45	144 11 20	2,011	86	86	.....	br. m. bk. s ..	.....do.....	
1021	....do...	16 39 45	144 11 30	1,969	87	86	.....	br. m. bk. s ..	.....do.....	
1022	....do...	16 49 15	144 12 20	2,298	86	86	35.5	br. m.....	.....do.....	
1023	....do...	16 51 00	144 12 15	2,392	83	86	.....	br. m.....	.....do.....	
1024	....do...	17 00 20	144 11 15	2,189	83	86	.....	br. m.....	.....do.....	
1025	....do...	17 02 15	144 11 00	2,271	84	85	.....	br. m.....	.....do.....	
1026	....do...	17 11 30	144 09 45	2,025	82	85	.....	br. m.....	.....do.....	
1027	....do...	17 13 30	144 09 30	2,314	83	85	.....	br. m.....	.....do.....	
1028	Sept. 12	17 22 45	144 08 40	2,382	82	85	.....	br. m. bk. s ..	.....do.....	
1029	....do...	17 24 45	144 08 30	2,356	83	85	.....	br. m.....	.....do.....	
1030	....do...	17 34 15	144 07 45	2,112	83	85	.....	br. m.....	.....do.....	
1031	....do...	17 36 00	144 07 30	2,091	81	85	.....	br. m. bk. s ..	.....do.....	
1032	....do...	17 45 30	144 07 00	2,351	82	86	.....	br. m. bk. s ..	.....do.....	
1033	....do...	17 47 30	144 06 45	2,451	84	86	.....	br. m. bk. s ..	.....do.....	
1034	....do...	17 57 00	144 06 00	1,990	87	86	.....	br. m. bk. s ..	.....do.....	
1035	....do...	17 59 00	144 05 40	2,175	88	86	.....	br. m.....	.....do.....	
1036	....do...	18 08 30	144 04 45	2,155	86	86	.....	br. m.....	.....do.....	
1037	....do...	18 10 30	144 04 30	2,022	89	86	.....	br. m. bk. s ..	.....do.....	
1038	....do...	18 20 00	144 02 30	2,451	86	86	35.5	br. m. bk. s ..	.....do.....	
1039	....do...	18 22 00	144 02 15	2,424	87	86	.....	br. m. bk. s ..	.....do.....	
1040	....do...	18 31 45	144 00 45	2,451	83	86	.....	br. m.....	.....do.....	
1041	....do...	18 33 45	144 00 30	2,433	84	85	.....	R. br. m	.....do.....	Manganese.
1042	....do...	18 43 30	143 59 15	2,225	83	84	.....	br. m.....	.....do.....	
1043	....do...	18 45 20	143 59 00	2,190	82	84	.....	.....	.....	No specimen.
1044	Sept. 13	18 55 00	143 57 30	2,303	83	84	35.7	br. m. bk. s ..	Volcanic mud.	
1045	....do...	18 57 00	143 57 15	2,330	83	83	.....	br. m. bk. s ..	.....do.....	
1046	....do...	19 06 00	143 56 30	2,220	82	83	.....	br. m. bk. s ..	.....do.....	
1047	....do...	19 08 00	143 56 15	2,133	82	84	.....	br. m. bk. s ..	.....do.....	
1048	....do...	19 17 30	143 55 00	1,967	85	85	36.8	br. m. bk. s ..	.....do.....	
1049	....do...	19 19 30	143 54 45	1,964	84	86	.....	br. m.....	.....do.....	Palagonite.
1050	....do...	19 29 00	143 53 45	2,278	87	86	.....	.....	.....do.....	
1051	....do...	19 31 00	143 53 30	2,180	83	86	.....	br. m.....	.....do.....	
1052	....do...	19 40 15	143 52 45	2,146	81	85	.....	br. m.....	.....	No specimen.
1053	....do...	19 42 15	143 52 30	2,151	82	85	.....	br. m.....	Volcanic mud.	
1054	....do...	19 52 30	143 52 00	1,863	82	85	.....	br. m.....	.....do.....	
1055	....do...	19 54 45	143 52 00	2,028	82	85	35.7	br. m.....	.....do.....	
1056	....do...	20 05 15	143 57 30	2,319	81	85	.....	br. m. bk. s ..	.....do.....	
1057	....do...	20 07 45	143 57 20	2,202	81	85	.....	br. m.....	.....do.....	
1058	....do...	20 18 20	143 51 00	1,930	82	85	35.6	br. m.....	.....do.....	
1059	....do...	20 20 45	143 50 45	1,987	82	85	.....	br. m.....	.....	Do.
1060	....do...	20 31 45	143 50 30	2,322	82	85	.....	br. m.....	Volcanic mud.	
1061	Sept. 14	20 34 30	143 50 30	2,181	82	85	.....	.....	.....	Do.
1062	....do...	20 45 15	143 50 15	2,040	81	85	35.5	br. m.....	Volcanic mud.	
1063	....do...	20 47 45	143 50 15	1,884	82	84	.....	br. m.....	.....do.....	
1064	....do...	20 58 30	143 50 00	1,588	82	84	.....	br. m.....	.....do.....	
1065	....do...	21 01 00	143 50 00	1,321	82	84	.....	br. m. bk. s ..	.....do.....	
1066	....do...	21 06 30	143 50 00	1,815	84	85	.....	br. m.....	.....do.....	
1067	....do...	21 12 15	143 49 45	2,191	83	85	.....	br. m. bk. s ..	.....do.....	
1068	....do...	21 14 30	143 49 30	2,207	85	85	.....	gy. m.....	.....do.....	
1069	....do...	21 20 15	143 48 45	2,335	83	85	.....	br. m.....	.....do.....	
1070	....do...	21 30 00	143 47 30	1,714	83	85	35.1	bk. s. gy. m ..	.....do.....	
1071	....do...	21 32 00	143 47 30	1,595	86	85	.....	bk. s. gy. m ..	.....do.....	
1072	....do...	21 37 15	143 46 30	1,470	85	86	.....	R	.....do.....	Manganese.
1073	....do...	21 42 45	143 45 30	1,208	85	86	.....	S	.....do.....	
1074	....do...	21 45 15	143 45 15	483	85	86	.....	bk. s.....	Volcanic sand.	

Abstract of the official record of soundings—Continued

GUAM TO YOKOHAMA—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	Fathoms.	°	°	°			
1075	Sept. 14	21 47 45	143 45 00	1,029	85	86	.....	bk. s. m	Volcanic mud.	
1076	....do...	21 53 00	143 44 00	1,530	84	86	.....	bk. s. wh. sp.	.....do.....	
1077	....do...	21 58 15	143 43 00	1,547	84	86	.....	gvl.....	.....do.....	Manganese.
1078	....do...	22 00 45	143 42 45	1,465	84	86	.....	gvl.....	.....do.....	Do.
1079	....do...	22 06 20	143 41 45	1,547	83	85	.....	fn. gvl.....	.....do.....	Do.
1080	....do...	22 17 30	143 40 40	1,815	82	85	.....	br. m. s.....	.....do.....	Do.
1081	....do...	22 20 15	143 40 45	1,900	82	85	.....	br. m. s.....	.....do.....	Do.
1082	Sept. 15	22 31 30	143 40 45	2,093	82	85	.....	bk. s. gy. m..	.....do.....	
1083	....do...	22 34 15	143 40 45	2,077	82	84	.....	br. m.....	.....do.....	
1084	....do...	22 45 30	143 40 45	2,313	83	84	.....	br. m.....	.....do.....	
1085	....do...	22 48 15	143 40 45	2,360	82	84	.....	br. m.....	.....do.....	
1086	....do...	22 59 30	143 41 15	2,677	83	84	.....	br. m.....	.....do.....	
1087	....do...	23 02 15	143 41 20	2,702	84	84	.....	br. m. gvl.....	.....do.....	
1088	....do...	23 13 30	143 41 45	2,952	83	85	.....	br. m.....	.....do.....	
1089	....do...	23 16 30	143 42 00	2,882	84	85	.....	br. m.....	.....do.....	
1090	....do...	23 27 30	143 41 20	2,725	89	86	.....	gvl. s.....	.....do.....	
1091	....do...	23 30 00	143 41 15	2,842	86	85	.....	br. m. s.....	.....do.....	
1092	....do...	23 40 20	143 40 30	3,189	85	85	.....	br. m.....	.....do.....	
1093	....do...	23 42 45	143 40 00	3,165	84	85	.....	br. m.....	.....do.....	
1094	....do...	23 52 30	143 37 45	3,595	83	84	.....	br. m.....	Red clay...	
1095	....do...	23 52 30	143 32 00	3,213	84	84	.....	br. m.....	Volcanic mud.	Volcanic glass.
1096	Sept. 16	23 52 30	143 26 00	2,998	83	84	.....	br. m.....	Red clay...	
1097	....do...	23 52 30	143 20 15	3,040	83	84	.....	br. m.....	.....do.....	
1098	....do...	23 57 40	143 19 45	3,259	82	84	.....	br. m.....	Volcanic mud.	Volcanic glass and radiolaria.
1099	....do...	23 59 40	143 19 40	3,251	84	84	.....	gvl.....	.....	No specimen.
1100	....do...	23 59 40	143 14 15	2,483	84	84	.....	br. m.....	Volcanic mud.	
1101	....do...	24 04 40	143 13 45	2,855	85	85	.....	br. m.....	.....do.....	
1102	....do...	24 04 40	143 07 45	2,425	87	85	35	gvl.....	.....do.....	Lumps of clay and manganese.
1103	....do...	24 09 40	143 07 30	2,294	87	85	.....	br. m. and s.	.....do.....	
1104	....do...	24 14 30	143 06 45	1,904	87	85	.....	R	.....do.....	Volcanic glass.
1105	....do...	24 19 15	143 06 00	1,749	86	85	35.1	gy. s. m.....	.....do.....	
1106	....do...	24 28 45	143 04 20	1,988	83	85	.....	gvl.....	.....do.....	Concretions of fine glass.
1107	....do...	24 30 45	143 04 15	2,190	84	85	.....	gvl.....	.....do.....	Do.
1108	....do...	24 39 30	143 04 15	2,645	83	85	.....	br. m. bk. s..	.....do.....	
1109	....do...	24 41 30	143 04 15	2,662	82	85	35	br. m. and s.	.....do.....	
1110	....do...	24 50 30	143 04 20	2,870	83	85	.....	br. m. bk. s..	.....do.....	
1111	....do...	24 52 30	143 04 20	2,788	83	84	.....	gvl.....	.....do.....	Concretions of glass.
1112	Sept. 17	25 01 30	143 04 30	2,564	81	83	.....	br. m. bk. s..	.....do.....	
1113	....do...	25 04 30	143 04 30	2,555	83	84	.....	br. m. s.....	.....do.....	
1114	....do...	25 12 20	143 05 00	2,413	83	84	35.1	br. m. bk. s..	.....do.....	
1115	....do...	25 14 20	143 05 00	2,261	82	85	.....	br. m. s.....	.....do.....	
1116	....do...	25 22 45	143 05 30	2,186	84	85	.....	br. m. s.....	.....do.....	
1117	....do...	25 24 45	143 05 30	2,123	84	85	.....	br. m. s.....	.....do.....	
1118	....do...	25 33 30	143 06 00	1,805	82	85	35.5	br. m. bk. s..	.....do.....	
1119	....do...	25 35 30	143 06 00	1,654	82	85	.....	br. m. s. gvl.	.....do.....	
1120	....do...	25 44 30	143 06 30	1,710	83	85	.....	br. m. s.....	.....do.....	
1121	....do...	25 46 30	143 06 45	1,887	82	86	.....	br. m. s.....	.....do.....	Brown glass and foraminifera.
1122	....do...	25 55 30	143 07 15	1,926	86	86	.....	gy. m. s.....	.....do.....	Do.
1123	....do...	25 57 30	143 07 15	1,877	86	86	35.1	gy. m. s.....	.....do.....	
1124	....do...	26 06 45	143 07 45	1,229	82	85	.....	R	.....do.....	Manganese.
1125	....do...	26 08 45	143 08 00	1,251	83	85	.....	gvl.....	.....do.....	Foraminifera, manganese, and lumps of clay.
1126	....do...	26 12 45	143 08 00	972	82	85	.....	gy. m. and s. bk. s.	.....do.....	
1127	....do...	26 12 45	143 12 15	1,337	82	85	35.7	gvl. s.....	.....do.....	
1128	....do...	26 17 00	143 12 30	1,418	82	84	.....	gy. m. and s.	.....do.....	Manganese and foraminifera.
1129	....do...	26 21 30	143 12 45	1,505	82	84	.....	gy. m. and s.	.....do.....	Do.
1130	Sept. 18	26 30 30	143 13 15	2,304	83	84	.....	gy. m. and s.	.....do.....	

Abstract of the official record of soundings—Continued.

GUAM TO YOKOHAMA—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1131	Sept. 18	26 32 30	143 13 15	2,351	82	84	.....	.....	.....	No specimen.
1132	....do...	26 41 15	143 13 45	2,950	82	84	35.1	br. m. and s.	Volcanic mud.	
1133	....do...	26 43 45	143 13 45	2,800	82	84	.....	br. m. and s.	.....do.....	
1134	....do...	26 47 45	143 14 00	2,879	83	85	.....	br. m. and s.	.....do.....	
1135	....do...	26 52 20	143 13 00	3,421	86	85	.....	br. m. and s.	.....do.....	
1136	....do...	26 52 20	143 07 00	3,132	86	85	.....	bk. s. gy. m.	.....do.....	
1137	....do...	26 52 15	143 00 20	2,250	89	86	.....	gy. m. and s.	.....do.....	
1138	....do...	26 48 00	143 02 15	1,837	87	86	35	R.....	.....do.....	Manganese.
1139	....do...	26 43 30	143 04 15	2,101	85	86	.....	gy. s. and m.	.....do.....	
1140	....do...	26 43 30	142 57 45	1,835	88	86	.....	gy. s. and m.	.....	No specimen.
1141	....do...	26 55 30	142 58 30	2,278	82	86	.....	gy. s. and m.	Volcanic mud.	
1142	....do...	27 04 40	142 57 00	2,682	83	86	.....	br. s. and m.	.....do.....	Radiolaria and diatoms.
1143	....do...	27 07 40	142 56 30	2,591	82	86	35.1	br. s. and m.	.....do.....	
1144	Sept. 19	27 17 30	142 54 45	2,543	82	84	.....	br. m. and s.	.....do.....	
1145	....do...	27 19 30	142 54 20	2,119	81	84	.....	bk. and gy. s. and m.	.....do.....	
1146	....do...	27 24 30	142 53 20	2,251	80	84	.....	bk. and gy. s. and m.	.....do.....	
1147	....do...	27 29 30	142 52 20	1,856	83	84	.....	gy. s. and m.	Globigerina ooze.	
1148	....do...	27 34 30	142 51 30	2,181	81	84	.....	bk. and gy. s. and m.	Volcanic mud.	
1149	....do...	27 39 15	142 50 45	2,106	84	84	.....	gy. C. bk. S.	.....do.....	
1150	....do...	27 48 45	142 49 45	1,746	82	84	.....	gy. m. and s.	Globigerina ooze.	
1151	....do...	27 57 00	142 49 30	1,686	83	84	.....	gy. m. and s.	Volcanic mud.	Many foraminifera.
1152	....do...	28 01 00	142 48 45	2,041	83	84	35.2	gy. C.....	.....do.....	Do.
1153	....do...	28 03 00	142 48 15	1,932	82	84	.....	gy. m. and s. R.	.....do.....	Do.
1154	....do...	28 12 20	142 43 30	1,602	82	85	.....	gy. s.....	.....do.....	
1155	....do...	28 14 30	142 42 30	1,632	82	85	.....	gy. m. and s.	.....do.....	
1156	....do...	28 23 45	142 37 45	1,660	83	85	.....	gy. m. and s.	.....do.....	
1157	....do...	28 25 15	142 36 45	1,617	83	85	.....	gy. m. and s.	.....do.....	
1158	....do...	28 35 20	142 33 45	1,584	82	85	.....	gy. m. and s.	.....do.....	
1159	....do...	28 37 20	142 32 15	1,515	82	85	.....	R.....	.....	No specimen.
1160	....do...	28 46 45	142 28 15	1,907	82	85	.....	gy. m. and s.	Volcanic mud.	Foraminifera.
1161	....do...	28 49 00	142 27 20	1,994	82	85	37	gy. m. and s.	.....do.....	Do.
1162	Sept. 20	28 58 40	142 23 30	2,095	82	85	.....	gy. m. and s.	Globigerina ooze.	
1163	....do...	29 00 45	142 22 30	2,049	82	83	.....	gy. m. and s.	.....do.....	
1164	....do...	29 10 30	142 18 30	2,384	83	83	.....	gy. m. and s.	Volcanic mud.	
1165	....do...	29 12 30	142 17 40	2,387	82	84	.....	gy. m. and s.	.....do.....	
1166	....do...	29 22 20	142 13 30	2,552	86	85	35	br. m. and s.	.....do.....	
1167	....do...	29 24 20	142 12 30	2,596	86	85	.....	br. m. and s.	.....do.....	
1168	....do...	29 34 00	142 08 30	2,933	85	85	.....	br. m. bk. s.	.....do.....	
1169	....do...	29 36 00	142 07 30	2,927	90	86	.....	C.....	.....	No specimen.
1170	....do...	29 45 00	142 02 15	2,912	86	86	35	gy. m. and c.	Volcanic mud.	
1171	....do...	29 46 45	142 01 15	2,826	88	86	.....	br. m. and s.	.....do.....	
1172	....do...	29 55 45	141 55 30	2,621	84	86	.....	br. m. and s. bk. s.	.....do.....	
1173	....do...	29 57 40	141 54 30	2,655	82	85	.....	br. m. bk. s.	.....do.....	
1174	....do...	30 06 00	141 48 30	2,490	82	85	.....	br. m. and s.	.....do.....	
1175	....do...	30 07 45	141 47 30	2,384	84	85	.....	br. m. and s.	.....do.....	
1176	Sept. 21	30 16 30	141 41 15	2,089	82	84	.....	br. m. and s.	.....do.....	
1177	....do...	30 18 15	141 40 00	1,987	82	84	35.1	gy. m. and s.	.....do.....	
1178	....do...	30 26 45	141 33 10	1,685	82	84	.....	gy. m. and s. bk. s.	.....do.....	
1179	....do...	30 28 30	141 32 15	1,652	82	84	.....	gy. m. bk. s.	.....do.....	
1180	....do...	30 36 45	141 25 30	1,617	81	85	35.2	gy. m. bk. s.	.....do.....	
1181	....do...	30 38 30	141 24 15	1,590	82	85	.....	gy. m. bk. s.	.....do.....	
1182	....do...	30 46 45	141 17 00	1,548	83	85	.....	gvl.....	.....do.....	Concretions of volcanic glass.
1183	....do...	30 48 30	141 16 00	1,454	82	85	.....	gy. m. bk. s.	.....do.....	Manganese.
1184	....do...	30 57 15	141 10 45	1,542	82	85	.....	br. m. and s.	.....do.....	
1185	....do...	30 59 00	141 09 30	1,491	82	85	35.2	gy. m. and s.	.....do.....	
1186	....do...	31 08 15	141 06 45	1,842	82	85	.....	gy. m. and s.	.....do.....	
1187	....do...	31 10 00	141 06 30	1,815	86	85	.....	gy. m. and s.	.....do.....	

Abstract of the official record of soundings—Continued.

GUAM TO YOKOHAMA—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1188	Sept. 21	31 18 15	141 03 30	1,595	80	85	35.2	gy. m. gy. and bk. s.	Volcanic mud.	
1189	....do...	31 20 00	141 02 45	1,562	80	84	.....	gy. m. gy. and bk. s.	.....do.....	
1190	....do...	31 27 40	141 00 30	1,543	79	84	.....	gy. m. and s.	.....do.....	
1191	....do...	31 29 15	141 00 00	1,551	79	84	.....	gy. m. and s.	.....do.....	
1192	....do...	31 37 45	140 57 15	1,545	78	83	.....	gy. m. and s.	.....do.....	
1193	....do...	31 39 20	140 56 30	1,512	77	82	.....	gy. m. and s.	.....do.....	
1194	Sept. 22	31 48 00	141 03 45	1,547	76	80	.....	gy. m. and s.	.....do.....	
1195	....do...	31 57 40	141 00 45	1,431	77	82	.....	gy. m. and s.	.....do.....	
1196	....do...	31 59 15	141 00 00	1,431	77	82	.....	gy. m. and s.	.....do.....	
1197	....do...	32 10 30	140 56 30	1,698	76	81	.....	gy. m. and s.	.....do.....	
1198	....do...	32 13 15	140 55 45	1,612	76	81	.....	gy. m. and s.	.....do.....	
1199	....do...	32 24 15	140 52 00	1,497	76	80	.....	gy. and br. m. and s.	.....do.....	
1200	....do...	32 27 15	140 51 15	1,460	76	80	.....	gy. m. gy. and bk. s.	.....do.....	
1201	....do...	32 39 30	140 47 30	1,268	76	81	.....	gy. m. gy. and bk. s.	.....do.....	
1202	....do...	32 42 00	140 46 45	1,199	75	81	.....	gy. m. gy. and bk. s.	.....do.....	
1203	Sept. 23	32 53 30	140 43 30	908	72	79	.....	gy. m. gy. and bk. s.	.....do.....	
1204	....do...	32 56 15	140 43 00	846	72	79	.....	bk. s	.....do.....	Concretions of sand and manganese.
1205	....do...	33 07 30	140 39 40	737	74	79	.....	bk. s	.....do.....	
1206	....do...	33 10 30	140 39 00	737	74	78	.....	bk. s. m.....	.....do.....	
1207	....do...	33 22 00	140 35 45	665	75	79	.....	bk. s. m.....	Blue mud.	
1208	....do...	33 25 00	140 35 00	665	74	79	.....	bk. s. m.....	.....do.....	
1209	....do...	33 36 15	140 32 15	660	74	80	.....	bk. s. gy. m.	.....do.....	
1210	....do...	33 38 45	140 31 15	688	74	80	.....	bk. gy. s	.....do.....	
1211	....do...	33 50 00	140 28 30	777	74	80	.....	bk. gy. s	.....do.....	
1212	....do...	33 52 00	140 27 40	815	74	80	.....	gvl.....	.....do.....	
1213	....do...	34 01 00	140 24 15	808	73	80	.....	bk. gy. s	.....do.....	Do.
1214	....do...	34 03 15	140 24 00	857	73	80	.....	bk. s. gvl.....	.....do.....	
1215	....do...	34 12 00	140 16 15	901	73	80	.....	bk. s. gn. m	.....do.....	
1216	....do...	34 14 00	140 14 00	920	73	80	36.6	bk. s. gn. m	.....do.....	
1217	....do...	34 21 45	140 04 00	934	72	80	36.2	gn. m	Green mud	
1218	....do...	34 23 00	140 01 45	932	73	77	.....	gn. m	.....do.....	
1219	....do...	34 25 00	139 57 45	879	73	77	.....	gn. m	.....do.....	
1220	....do...	34 26 45	139 53 30	786	73	77	36	gn. m. br. s	.....do.....	
1221	....do...	34 28 30	139 49 30	781	71	78	.....	gn. m. bk. s	.....do.....	
1222	....do...	34 30 00	139 45 15	726	71	78	.....	gn. m. bk. s.	.....do.....	
1223	....do...	34 31 45	139 41 00	676	71	78	.....	gn. m. bk. br. s.	.....do.....	
1224	Sept. 24	34 33 00	139 36 30	660	70	78	.....	gn. m. bk. br. s.	.....do.....	
1225	....do...	34 41 00	139 33 15	805	69	78	41.1	bk. s. gn. m..	.....do.....	
1226	....do...	34 44 30	139 32 00	977	69	77	.....	bk. s. gn. m..	.....do.....	
1227	....do...	34 47 20	139 31 00	812	69	77	.....	bk. s. gn. m..	.....do.....	
1228	....do...	34 50 00	139 26 00	792	69	77	.....	bk. s. gn. m..	.....do.....	
1229	....do...	34 50 45	139 24 45	650	69	77	.....	gvl.....	Manganese nodules.	Fine sediment, washed out.
1230	....do...	34 51 00	139 24 00	689	69	77	.....	gn. m. bk. s..	.....do.....	
1231	....do...	34 51 30	139 23 00	807	69	77	.....	gn. m. bk. s..	.....do.....	
1232	....do...	34 54 00	139 20 20	905	69	77	.....	gn. m. bk. s..	.....do.....	
1233	....do...	34 57 45	139 19 40	807	68	75	.....	gn. m. bk. and br. s.	.....do.....	
1234	....do...	35 00 30	139 21 45	805	68	75	.....	gn. m. bk. s..	.....do.....	
1235	....do...	35 03 40	139 24 00	720	69	75	.....	gn. m. bk. s..	.....do.....	
1236	....do...	35 06 30	139 25 15	652	69	75	.....	gn. m. bk. s..	.....do.....	
1237	....do...	35 07 30	139 26 00	613	69	75	.....	gn. m. bk. s..	.....do.....	Yokohama.

YOKOHAMA TO GUAM.

1238	Oct. 10	34 51 30	139 37 30	272	68	73	.....	bk. s. and gvl	Green mud	
1239	....do...	34 48 45	139 35 30	1,005	69	74	.....	bk. m. and s.	.....do.....	
1240	....do...	34 47 15	139 40 30	612	69	74	.....	bk. and gy. m. and s.	.....do.....	
1241	....do...	34 43 15	139 38 00	1,115	69	74	.....	bk. and gy. m. and s.	.....do.....	

Abstract of the official record of soundings—Continued.

YOKOHAMA TO GUAM—Continued,

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1242	Oct. 10	34 44 30	139 49 30	797	72	74	.....	bk. and gy. m. and s.	Green mud.	
1243	....do...	34 37 15	139 50 00	1,277	69	74	.....	bk. s	.....do.....	
1244	....do...	34 39 15	140 00 00	1,363	69	74	.....	bk. and gy. m. and s.	.....do.....	
1245	....do...	34 29 45	139 58 45	1,098	69	74	.....	gvl	.....do.....	
1246	Oct. 11	34 20 20	139 57 30	1,299	70	70	.....	bk. and gy. m. and s.	.....do.....	
1247	....do...	34 29 45	140 23 30	1,814	70	75	.....	.....	.....	No specimen.
1248	....do...	34 21 15	140 21 30	1,742	70	75	.....	bk. s	.....	Do.
1249	....do...	34 13 00	140 19 30	1,323	69	75	.....	bk. and gy. m. and s.	Blue mud.	
1250	....do...	34 06 00	140 10 00	733	70	75	.....	bk. s	.....do.....	
1251	....do...	34 08 15	140 33 00	1,270	72	78	.....	gy. m	.....do.....	
1252	....do...	33 50 30	140 20 00	745	70	77	37	gy. and bk. m. and s.	.....do.....	
1253	....do...	33 47 45	140 38 15	1,194	70	77	.....	gy. m	.....do.....	
1254	....do...	33 32 40	140 20 00	264	69	76	.....	fn. gvl.....	Coral sand.	Pteropods and foraminifera.
1255	....do...	33 30 00	140 25 45	439	68	76	.....	fn. gvl.....	Blue mud.	
1256	....do...	33 27 45	140 30 45	600	70	76	.....	fn. bk. s.....	.....do.....	
1257	Oct. 12	33 23 00	140 41 30	812	69	76	.....	gy. m.....	.....do.....	
1258	....do...	33 05 45	140 24 00	454	67	76	43.7	gvl	.....do.....	Manganese.
1259	....do...	32 57 30	140 45 00	964	70	79	.....	gy. m. bk. s..	.....do.....	
1260	....do...	32 56 15	140 50 00	1,094	74	80	.....	gy. m	Volcanic mud.	
1261	....do...	32 47 45	140 35 45	920	70	80	.....	gy. m. bk. s.	.....do.....	
1262	....do...	32 39 30	140 57 30	1,428	72	78	.....	br. m. bk. s..	.....do.....	
1263	....do...	32 28 45	140 37 45	1,246	72	78	35.4	br. m. bk. s..	.....do.....	
1264	....do...	32 22 00	141 02 30	2,080	73	79	.....	bk. s.....	.....do.....	Manganese and volcanic glass
1265	....do...	32 10 30	140 44 00	1,444	71	78	35.2	gy. m.....	.....do.....	
1266	Oct. 13	32 05 00	141 07 30	1,730	73	77	.....	gy. m.....	.....do.....	
1267	....do...	31 54 00	140 49 00	1,461	71	77	35.3	gy. m.....	.....do.....	
1268	....do...	31 48 00	141 11 15	1,651	74	77	.....	gy. m.....	.....do.....	
1269	....do...	31 36 20	140 53 30	1,622	75	80	35	gy. m. bk. s..	.....do.....	
1270	....do...	31 29 45	141 16 00	1,915	75	80	.....	gy. m	.....do.....	
1271	....do...	31 17 30	140 58 00	1,557	77	80	.....	gy. m.....	.....do.....	
1272	....do...	31 12 30	141 18 30	2,165	71	79	.....	gy. m. bk. s..	.....do.....	
1273	....do...	31 00 30	140 58 30	1,463	75	78	35.1	gy. m. bk. s..	.....do.....	
1274	Oct. 14	30 56 30	141 18 40	1,600	73	78	.....	gy. m. bk. s..	.....do.....	
1275	....do...	30 41 45	141 01 45	1,620	73	78	.....	gvl	.....do.....	
1276	....do...	30 42 00	141 23 00	1,807	74	79	35	gvl. gy. m	.....do.....	
1277	....do...	30 29 30	141 12 30	1,857	77	80	.....	gvl. crs. bk. s	.....do.....	
1278	....do...	30 28 30	141 41 30	2,266	75	80	35	gy. m. bk. s..	.....do.....	
1279	....do...	30 51 00	141 29 00	2,175	75	80	.....	gvl. bk. s	.....do.....	
1280	....do...	30 19 00	141 24 30	2,215	79	81	35	bk. s.....	.....do.....	
1281	Oct. 15	30 19 30	141 48 00	2,558	78	80	.....	gy. m. bk. s..	.....do.....	
1282	....do...	30 07 00	141 37 00	2,299	80	81	35	gy. m. bk. s..	.....do.....	
1283	....do...	30 05 20	142 02 30	2,767	84	81	.....	gy. m. bk. s..	.....do.....	
1284	....do...	29 50 45	141 29 00	2,588	79	81	.....	gy. m. bk. s..	.....do.....	
1285	....do...	29 46 20	142 13 00	3,576	80	81	35.2	gy. m. bk. s..	.....do.....	
1286	Oct. 17	29 23 30	141 45 30	1,606	77	80	.....	.....	.....	Typhoon; no specimen.
1287	....do...	29 24 00	141 54 45	1,606	78	80	35	gy. m. bk. s..	Volcanic mud.	
1288	....do...	29 25 00	142 03 15	1,755	78	80	.....	wh. and bk. s	Globigerina ooze.	
1289	....do...	29 25 45	142 13 00	2,651	74	80	.....	br. m.....	Volcanic mud.	
1290	....do...	29 21 15	142 34 00	4,350	76	81	.....	br. m.....	.....do.....	
1291	....do...	29 32 20	142 21 30	4,212	79	80	.....	br. m.....	.....do.....	
1292	....do...	29 36 00	142 00 00	2,371	74	80	35	br. m. bk. and wh. s.	.....do.....	
1293	....do...	29 37 15	141 50 45	2,141	73	80	.....	br. m.....	.....do.....	
1294	Oct. 18	29 17 30	142 04 30	1,417	74	79	.....	wh. gy. bk. s.	Globigerina ooze.	
1295	....do...	29 10 30	141 57 30	1,415	74	79	.....	gy. bk. s. and gy. m.	.....do.....	
1296	....do...	29 09 00	142 08 40	1,758	73	79	.....	gy. m.....	.....do.....	
1297	....do...	29 00 45	142 12 00	1,954	74	81	.....	gy. m.....	Volcanic mud.	

Abstract of the official record of soundings—Continued.

YOKOHAMA TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1298	Oct. 18	28 53 30	142 05 40	1,711	76	81	.....	gy. m. and gy. wh. s.	Globigerina ooze.	
1299	....do...	28 50 00	142 17 00	1,817	76	82	.....	gy. m. and gy. wh. s.	.....do.....	
1300	....do...	28 40 40	142 21 00	1,529	80	81	.....	gy. m.....	.....do.....	
1301	....do...	28 33 00	142 14 00	1,088	77	81	35.9	gy. m. s.....	.....do.....	
1302	....do...	28 31 00	142 25 00	1,331	75	81	.....	gy. m. s.....	.....do.....	
1303	....do...	28 21 15	142 28 15	1,410	75	81	35.1	gy. m. s.....	.....do.....	
1304	....do...	28 13 00	142 20 30	847	76	81	.....	gy. m. bk. s..	.....do.....	Much manganese and volcanic sand.
1305	....do...	28 10 30	142 31 00	1,289	75	80	.....	gy. m.....	.....do.....	
1306	....do...	28 00 00	142 34 00	1,208	75	81	.....	gy. m. bk. s..	.....do.....	
1307	Oct. 19	27 52 40	142 25 00	616	76	81	38.3	gy. m. bk. s..	.....do.....	
1308	....do...	27 49 00	142 34 30	1,040	75	80	.....	bk. and gy. s and m.	.....do.....	
1309	....do...	27 38 30	142 34 30	891	77	80	.....	bk. and gy. s.	.....do.....	Do.
1310	....do...	27 33 30	142 23 30	518	78	80	.....	bk. and gy. s.	.....do.....	Do.
1311	....do...	27 54 40	142 42 15	1,503	80	82	.....	gy. m.....	.....do.....	
1312	....do...	27 40 30	142 43 15	1,552	76	82	.....	gy. m.....	.....do.....	
1313	....do...	27 30 30	142 44 15	1,716	79	82	.....	gy. m. bk. s.	Volcanic mud.	
1314	....do...	27 22 45	142 45 30	1,660	81	82	.....	gy. m. bk. s.	.....do.....	
1315	....do...	27 20 45	142 45 40	1,494	81	82	.....	gy. m. bk. s.	.....do.....	Manganese and foraminifera.
1316	....do...	27 19 00	142 45 45	1,649	80	82	35	gy. m. bk. s.	.....do.....	Do.
1317	....do...	27 18 30	142 36 30	1,453	77	82	.....	gy. m. bk. s.	.....do.....	Do.
1318	....do...	27 13 30	142 46 30	1,210	76	81	.....	gy. m. bk. s.	.....do.....	Do.
1319	....do...	27 08 15	142 47 30	2,167	78	81	35	br. m. bk. s.	.....do.....	
1320	....do...	27 02 45	142 48 30	2,048	78	81	.....	gy. m. bk. s.	.....do.....	Foraminifera.
1321	Oct. 20	26 56 00	142 41 00	1,618	78	81	35	gy. m. bk. s.	.....do.....	Do
1322	....do...	26 49 45	142 51 40	2,142	78	81	.....	gy. m. bk. s..	.....do.....	
1323	....do...	26 38 00	142 53 00	1,583	78	81	.....	bk. and gy. s. gy. m.	.....do.....	
1324	....do...	26 31 00	142 44 15	1,915	79	81	35	br. m. bk. s..	.....do.....	
1325	....do...	26 25 00	142 55 00	847	80	82	.....	bk. and wh. s. gy. m.	.....do.....	
1326	....do...	26 30 30	143 02 15	865	79	82	.....	bk. s. gvl.....	.....do.....	
1327	....do...	26 15 30	142 56 00	1,591	80	83	35	gy. m. bk. s..	.....do.....	
1328	....do...	26 20 30	142 56 00	871	79	83	.....	bk. wh. s.....	.....do.....	Foraminifera and volcanic glass.
1329	....do...	26 22 00	142 50 40	1,709	82	83	.....	gvl.....	.....do.....	Manganese iron.
1330	....do...	26 23 30	142 45 00	1,543	81	83	.....	gy. m.....	.....do.....	
1331	....do...	26 25 45	142 39 45	1,257	81	82	35.6	gy. bk. s.....	.....do.....	
1332	....do...	26 38 00	142 50 00	1,807	80	82	.....	gy. m.....	.....do.....	
1333	....do...	26 36 00	142 37 00	1,186	79	82	35.1	gy. m. bk. s..	.....do.....	
1334	....do...	26 16 45	142 41 00	1,334	78	82	.....	s. gvl.....	.....do.....	
1335	....do...	26 14 00	142 51 15	1,525	79	82	35	gy. bk. s	.....do.....	
1336	Oct. 21	26 08 20	142 59 00	1,521	79	81	.....	.....	.....	No specimen.
1337	....do...	26 02 45	143 06 40	1,485	80	81	35.6	br. wh. s.....	Volcanic mud.	
1338	....do...	25 57 30	142 59 00	1,424	79	82	.....	bl. br. s. gy. m.	.....do.....	
1339	....do...	25 52 30	142 51 20	1,801	78	82	.....	gy. m. bk. s..	.....do.....	
1340	....do...	25 46 15	143 01 15	2,000	81	81	35	gvl. bk. s.....	.....do.....	Manganese nodules.
1341	....do...	25 37 15	143 57 00	1,602	80	82	.....	br. bk. s.....	.....do.....	Brown glass.
1342	....do...	25 32 20	142 47 45	1,710	81	83	35	gy. m. bk. s..	.....do.....	
1343	....do...	25 28 00	142 57 40	1,748	84	83	.....	bk. s. gvl.....	.....do.....	Manganese glass, and foraminifera.
1344	....do...	25 18 00	142 57 30	1,995	87	83	.....	gy. m. bk. s.	.....do.....	
1345	....do...	25 13 20	142 47 30	1,449	81	83	35.5	bk. s. gvl.....	.....do.....	
1346	....do...	25 07 30	142 57 00	1,755	79	83	35	gy. bk. s. gy m.	.....do.....	
1347	...do....	24 57 00	142 56 30	2,482	80	83	35.2	gy. m. bk. s..	.....do.....	
1348	...do....	24 59 45	142 52 00	2,207	80	83	35	br. m. bk. s..	.....do.....	
1349	...do....	25 02 30	142 47 30	1,624	80	83	35	gvl.....	.....do.....	Manganese.
1350	Oct. 22	24 52 00	142 47 00	2,249	79	81	35	gy. m. bk. s..	.....do.....	
1351	...do....	24 49 00	142 52 00	2,427	79	81	35	gy.. mbk. s..	.....do.....	

Abstract of the official record of soundings—Continued.

YOKOHAMA TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1352	Oct. 22	24 46 00	142 56 30	2,355	80	81	35	br. m. bk. s ..	Volcanic mud.	
1353	...do	24 40 40	142 56 15	2,065	80	82	.....	gy. m.....	.....do	
1354	...do	24 35 30	142 56 00	2,095	81	83	35	gy. m. bk. s..	.....do	
1355	...do	24 32 40	142 51 30	1,843	81	83	35	gy. m. bk. s..	.....do	
1356	...do	24 30 00	142 47 00	1,749	83	80	35	gy. m. bk. s..	.....do	
1357	...do	24 24 30	142 56 00	1,735	82	83	35	gy. m. bk. s..	.....do	
1358	...do	24 17 00	142 58 30	1,774	85	84	35.1	gy. m. bk. s..	.....do	
1359	...do	24 10 30	142 50 40	1,737	84	85	.....	gvl	.....do	Fibrous glass.
1360	...do	24 07 20	143 00 30	2,368	88	85	35	gy. m. bk. s ..	.....do	
1361	...do	24 01 15	142 52 30	2,373	79	84	35	br. m. bk. s ..	.....do	
1362	...do	23 57 45	143 03 30	2,673	81	84	35	br. m. bk. s ..	.....do	
1363	...do	23 54 20	143 14 15	2,599	80	83	.....	br. m. bk. s ..	.....do	
1364	Oct. 23	23 27 45	143 06 45	2,744	80	83	35	br. m. bk. s ..	.....do	
1365	...do	23 41 45	142 59 15	2,272	81	83	35	br. m. bk. s ..	.....do	
1366	...do	23 38 00	143 10 00	2,368	81	84	36	br. m. bk. s ..	.....do	
1367	...do	23 34 30	143 21 30	2,609	84	84	35.1	br. m. bk. s ..	.....do	
1368	...do	23 28 00	143 13 30	2,323	84	84	.....	bk. s. gy. m ..	.....do	
1369	...do	23 21 45	143 06 00	1,952	81	84	35	bk. s. gy. m ..	.....do	
1370	...do	23 18 15	143 16 40	2,588	85	84	35.1	br. m	.....do	
1371	...do	23 14 20	143 27 30	2,961	79	84	35	br. m	.....do	
1372	...do	23 08 15	143 20 00	2,582	81	84	35	br. m	.....do	
1373	...do	23 02 00	143 12 45	2,478	80	84	35	br. m. bk. s ..	.....do	
1374	Oct. 24	22 57 30	143 22 45	2,548	81	84	35	br. m. bk. s ..	.....do	
1375	...do	22 52 45	143 33 00	2,483	81	84	35	br. m. bk. s ..	.....do	
1376	...do	22 48 15	143 24 30	2,415	81	84	35	br. m.....	.....do	
1377	...do	22 43 30	143 16 30	2,127	81	84	35	gy. m.....	.....do	
1378	...do	22 38 45	143 26 30	2,122	81	85	.....	gy. m. bk. s ..	.....do	
1379	...do	22 34 15	143 36 30	2,131	86	85	35	gy. m. bk. s ..	.....do	
1380	...do	22 29 45	143 28 00	2,023	85	85	35	gy. m. bk. s ..	.....do	
1381	...do	22 25 00	143 18 40	1,099	86	85	35	bk. gy. s. gvl.	.....do	
1382	...do	22 15 00	143 22 20	1,297	84	85	35.3	bk. gy. s	.....do	
1383	...do	22 19 00	143 26 00	1,388	83	85	35.6	bk. gy. s. gy. m.	.....do	
1384	...do	22 14 45	143 31 45	1,532	82	85	35.3	br. m. bk. s ..	.....do	
1385	...do	22 11 30	143 26 00	1,236	82	85	36	br. m. bk. s ..	.....do	
1386	...do	22 08 15	143 20 15	802	82	84	37	bk. gy. s	.....do	
1387	...do	22 02 30	143 26 30	1,197	82	84	.....	bk. s.....	.....do	
1388	Oct. 25	21 48 36	143 40 45	1,668	81	83	35.5	.....	.....	No specimen.
1389	....do ...	21 45 45	143 41 15	1,653	82	83	.....	br. m. bk. s..	Volcanic mud.	
1390	....do ...	21 42 30	143 41 30	1,801	81	83	35.2	gy. m. bk. s..	.....do.	
1391	....do ...	21 39 15	143 42 00	1,849	81	80	35.3	gy. m. bk. s..	.....do	
1392	....do ...	21 36 00	143 42 30	1,615	82	84	35.2	gy. m. bk. s..	.....do	
1393	....do ...	21 42 00	143 49 00	1,971	82	84	.....	bk. s	.....do	
1394	....do ...	21 48 00	143 55 00	1,460	82	84	.....	br. s. and m. bk. s.	.....do	
1395	....do ...	21 50 00	143 43 00	1,248	88	85	36.5	br. s. and m. bk. s.	.....do	
1396	....do ...	21 45 15	143 42 45	1,046	85	85	.....	r	.....do	Manganese.
1397	....do ...	21 58 15	143 33 00	1,053	82	85	36	bk. s. gvl.....	... .do	Brown glass.
1398	....do ...	21 57 30	143 38 00	1,392	87	85	35.5	bk. s.....	.....do	
1399	....do ...	21 54 00	143 34 00	1,215	84	85	36	bk. s.....	.....do	
1400	....do ...	21 49 40	143 29 15	1,374	83	85	35.5	bk. s.....	.....do	
1401	....do ...	21 46 15	143 34 00	1,594	81	85	35.6	bk. s.....	.....do	
1402	....do ...	21 43 30	143 29 00	1,715	83	84	35.2	bk. s.....	.....do	
1403	....do ...	21 40 00	143 24 00	1,820	83	84	.....	bk. s.....	.....do	
1404	Oct. 26	21 37 00	143 33 30	1,489	81	84	37	bk. s. gvl.....	.....do	
1405	....do ...	21 29 30	143 26 00	1,962	81	84	.....	br. m. bk. s..	.....do	
1406	....do ...	21 26 45	143 35 00	1,692	81	85	.....	r.	.....do	Manganese concretions.
1407	....do ...	21 19 30	143 27 00	1,865	81	85	35.3	br. m. bk. s..	.....do	
1408	....do ...	21 17 00	143 36 30	1,620	81	85	35.5	br. m. bk. s..	.....do	
1409	....do ...	21 14 30	143 46 15	2,209	86	85	35.4	br. m. bk. s..	.....do	
1410	....do ...	21 28 15	143 56 30	1,898	83	85	35.5	br. m. bk. s..	.....do	
1411	....do ...	21 38 00	143 57 15	1,956	82	85	.....	br. m. bk. s..	.....do	
1412	....do ...	21 57 30	143 52 00	1,144	81	85	36	br. m. and s. bk. s.	.....do	
1413	....do ...	21 52 15	143 30 30	838	82	85	36.7	bk. s.....	.....do	
1414	....do ...	21 47 00	143 49 00	1,714	82	84	35.3	bk. s. br. m ..	.....do	
1415	Oct. 27	21 46 30	144 02 00	1,300	81	84	35.5	br. m. and s. bk. s.	.....do	
1416	....do ...	21 34 45	144 03 00	1,912	80	84	.....	bk. s.....	.....do	
1417	....do ...	21 15 15	143 56 30	1,691	81	84	35.2	br. m. bk. s..	.....do	

Abstract of the official record of soundings—Continued.

YOKOHAMA TO GUAM—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1418	Oct. 27	21 05 30	143 36 45	2,143	81	84	.....	br. m. bk. s..	Volcanic mud.	
1419	....do...	20 53 00	143 55 15	1,874	84	85	35.3	br. m. and s.	.....do.....	
1420	....do...	20 46 30	143 39 40	2,095	85	85	.....	br. m. bk. s..	.....do.....	
1421	....do...	20 39 45	143 59 30	1,889	82	84	.....	br. m. bk. s..	.....do.....	
1422	....do...	20 31 00	143 43 00	2,250	83	84	35.5	br. m. bk. s..	.....do.....	
1423	Oct. 28	20 24 15	144 03 45	2,139	82	84	.....	br. m. bk. s..	.....do.....	
1424	....do...	20 16 00	143 47 15	1,831	82	84	.....	br. m. bk. s..	.....do.....	
1425	....do...	20 09 30	144 08 00	1,833	82	84	35.5	br. m. bk. s..	.....do.....	
1426	....do...	19 59 45	143 48 00	2,151	84	84	.....	br. m. bk. s..	.....do.....	
1427	....do...	19 51 45	144 03 15	2,472	85	85	35.6	br. m. bk. s..	.....do.....	
1428	...do...	19 39 00	143 44 00	1,981	88	85	35.3	br. m. bk. s..	.....do.....	
1429	....do...	19 28 40	144 03 40	1,972	82	85	35.3	br. m. bk. s..	.....do.....	
1430	....do...	19 15 30	143 46 30	2,433	82	85	35.3	br. m. bk s ..	.....do.....	
1431	Oct. 29	19 06 15	144 06 00	2,308	82	84	35.4	br. m. bk. s ..	.....do.....	
1432	....do...	18 53 30	143 48 15	1,906	82	84	35.1	bk. s	.....do.....	
1433	....do...	18 44 15	144 05 15	2,169	83	84	.....	br. m. bk. s..	.....do.....	
1434	....do...	18 33 00	143 49 45	2,202	86	85	35.2	br. m. bk. s ..	.....do.....	
1435	....do...	18 25 45	144 12 00	2,349	81	85	35.6	br. m. bk. s ..	.....do.....	
1436	....do...	18 13 20	143 54 00	2,265	84	84	35.2	br. m. bk. s ..	.....do.....	
1437	....do...	18 05 00	144 13 30	2,127	80	84	35.2	br. m. bk. s ..	.....do.....	
1438	Oct. 30	17 53 00	143 56 00	2,114	82	84	.....	br. m. bk. s ..	.....do.....	
1439	....do...	17 44 30	144 15 30	1,901	82	84	35.3	br. m. bk. s ..	.....do.....	
1440	....do...	17 32 45	143 58 00	1,737	83	84	35.1	br. m. bk. s ..	.....do.....	
1441	....do...	17 24 00	144 17 20	2,036	81	85	.....	br. m. bk. s ..	.....do.....	
1442	....do...	17 11 30	144 00 00	2,002	91	85	35	bk. br. s. br. m.	.....do.....	
1443	....do...	17 03 00	144 18 00	2,329	82	84	35.4	bk. br. s. br. m.	.....do.....	
1444	....do...	16 51 30	143 59 45	2,175	83	84	35.1	bk. br. s. br. m.	.....do.....	
1445	....do...	16 42 45	144 18 00	2,043	82	84	.....	bk. br. s. br. m.	.....do.....	
1446	Oct. 31	16 31 00	143 59 30	2,113	82	84	35	bk. br. s. br. m.	.....do.....	
1447	....do...	16 23 00	144 17 30	2,447	83	84	35.3	bk. br. s. br. m.	.....do.....	
1448	....do...	16 11 00	143 58 30	2,084	81	85	.....	bk. br. s. br. m.	.....do.....	
1449	....do...	16 01 20	144 20 20	2,365	82	85	35.1	bk. br. s. br. m.	.....do.....	
1450	....do...	15 51 30	144 04 15	2,401	85	85	35.1	br. m. bk. s ..	.....do.....	
1451	....do...	15 45 00	144 26 20	1,801	80	84	35.2	br. m. bk. s ..	.....do.....	
1452	...do...	15 34 45	144 12 00	2,116	79	84	35	br. m. bk. s ..	.....do.....	
1453	Nov. 1	15 20 15	144 32 45	2,164	79	84	35	br. m. bk. s ..	.....do.....	
1454	....do...	15 16 30	144 16 45	2,221	81	84	.....	br. m. bk. s ..	.....do.....	
1455	....do...	15 10 30	144 36 15	2,000	84	85	.....	br. m. bk. s ..	.....do.....	
1456	....do...	14 57 30	144 18 30	2,245	86	86	.....	br. m. bk. s ..	.....do.....	
1457	....do...	14 50 45	144 37 00	1,970	85	85	35.2	br. m. bk. s ..	.....do.....	
1458	....do...	14 37 45	144 17 15	2,339	86	85	.....	gy. m. and s ..	.....do.....	
1459	....do...	14 30 40	144 36 20	1,981	82	84	35	gy. m. bk. s ..	.....do.....	
1460	Nov. 2	14 17 30	144 19 30	2,053	83	84	35	c	.....do.....	Fragments of volcanic glass.
1461	....do...	14 10 00	144 39 00	1,946	82	84	35	gvl. br. m ...	.....do.....	
1462	....do...	13 57 20	144 23 00	2,111	81	84	35	br. m. br. bk. s.	.....do.....	Volcanic glass.
1463	....do...	13 49 00	144 43 15	951	76	84	.....	br. m. br. bk. s.	Globigerina ooze.	
1464	....do...	13 47 40	144 38 00	891	80	86	.....	gy. m. bk. s..	.....do.....	
1465	....do...	13 47 00	144 35 30	993	83	85	.....	r	.....do.....	San Luis d' Apra, Guam.

GUAM TO MIDWAY ISLANDS.

1466	Nov. 12	13 26 30	144 36 37	234	78	.....	.....	co. s. and m.	Coral mud.	
1467	....do...	13 39 20	144 41 20	518	79	84	.....	co. s. and m.	Globigerina ooze.	
1468	....do...	13 46 15	144 25 45	1,731	87	84	.....	co. s. and m.	.....do.....	
1469	....do...	13 20 20	144 28 15	1,017	82	84	.....	....	....	No specimen.
1470	....do...	13 15 15	144 26 45	679	81	84	40.5	co. s. and m.	Globigerina ooze.	
1471	....do...	13 12 15	144 22 30	503	80	84	39.8	co. s. and m.	.....do.....	

Abstract of the official record of soundings—Continued.

GUAM TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	Fathoms.	°	°	°			
1472	Nov. 12	13 17 00	144 32 00	1,000	81	84	.....	co. s. gy. s...	Globigerina ooze.	Gren sand Mollusks.
1473	....do...	13 05 15	144 34 30	716	81	84	.....	co. s. gy. s...	.....	
1474	....do...	12 58 30	144 42 45	1,074	82	84	37.4	bk. s. g	.....	No specimen.
1475	Nov. 13	12 58 30	144 53 30	1,817	81	84	.....	co. s. and m.	Globigerina ooze.	Do.
1476	....do...	13 06 00	145 00 15	1,327	81	83	35.5	co. s. and m.	.....do.....	
1477	....do...	13 05 45	145 10 20	1,536	80	83	.....	co. s. and m.	.....do.....	
1478	....do...	13 05 30	145 20 30	2,026	80	84	.....	co. s. and m.	.....do.....	
1479	....do...	13 05 15	145 30 45	2,675	86	84	35	br. m.....	Volcanic mud.	
1480	....do...	13 05 00	145 40 45	3,071	83	85	.....	br. m. and g.	Red clay...	
1481	....do...	13 04 30	145 49 30	4,472	85	85	.....	br. m. and s.	.....do.....	
1482	....do...	12 44 30	145 47 30	5,160	82	85	.....	No specimen	.....	Do.
1483	....do...	12 40 45	145 56 15	4,249	81	84	.....	br. m. and s.	Red clay...	
1484	Nov. 14	13 03 00	145 58 00	4,560	81	84	35.5	No specimen	.....	Do
1485	....do...	12 50 15	145 45 00	4,675	82	84	35.6	br. s. and m.	Red clay...	Minute specimen. Fragments of Coscinodiscus.
1486	....do...	12 46 00	145 47 30	5,070	81	84	35.9	s	.....do.....	Do.
1487	....do...	12 44 00	145 46 45	5,101	82	84	36	yl. m.....	.....do.....	Do.
1488	....do...	12 43 15	145 49 00	5,269	81	84	.....	No specimen	.....	Deepest sounding.
1489	Nov. 15	13 12 40	145 04 00	1,240	81	84	.....	gy. s. and m.	Globigerina ooze.	
1490	....do...	13 15 45	144 51 30	707	83	84	.....	gy. s. and m.	.....do.....	
1491	....do...	13 26 30	145 06 20	939	81	84	.....	gy. s. and m.	.....do.....	
1492	....do...	13 35 00	145 13 00	1,054	82	84	36.7	gy. s. and m.	.....do.....	
1493	....do...	13 25 45	145 22 30	1,683	84	84	.....	gy. s. and m.	.....do.....	
1494	....do...	13 32 30	145 16 00	1,316	82	84	.....	gy. s. and m.	.....do.....	
1495	....do...	13 46 15	145 22 45	1,444	80	84	.....	gy. s. and m.	.....do.....	
1496	....do...	13 38 30	145 39 45	2,285	81	84	.....	gy. s. gy. and br. m.....	Volcanic mud.	Manganese and foraminifera.
1497	....do...	13 58 30	145 35 00	1,903	81	84	.....	gy. s. gy. and br. m.....	Globigerina ooze.	
1498	Nov. 16	13 56 15	145 57 45	2,259	81	84	.....	gy. and br. m. and s.	Volcanic mud.	
1499	....do...	14 13 15	145 45 30	2,043	81	84	.....	gy. and br. m. and s.	.....do.....	
1500	....do...	14 17 00	146 05 45	2,650	83	84	.....	br. m. bk. s..	Red clay...	
1501	....do...	14 32 45	145 55 00	2,151	82	84	.....	br. m. bk. s..	Volcanic mud.	
1502	....do...	14 37 30	146 17 30	2,330	81	84	.....	br. m. and g .	.....do.....	
1503	....do...	14 53 45	146 07 15	2,253	81	84	.....	g.....	.....	No specimen.
1504	Nov. 17	14 58 30	146 29 00	2,586	81	84	.....	br. m. bk. s..	Volcanic mud.	
1505	....do...	15 18 00	146 39 45	2,884	81	84	.....	br. m. bk. s..	.....do.....	
1506	....do...	15 24 30	146 32 30	2,720	82	84	.....	br. m. bk. s..	.....do.....	
1507	....do...	15 30 30	146 38 45	2,983	82	84	35.5	br. m. bk. s..	.....do.....	
1508	....do...	15 39 20	146 38 20	2,841	85	84	33	br. m. bk. s..	.....do.....	
1509	....do...	15 14 15	146 25 00	2,446	82	84	.....	br. m. bk. s..	.....do.....	
1510	....do...	15 32 30	146 47 00	3,167	82	84	34	br. m. bk. s..	.....do.....	
1511	Nov. 18	15 52 15	146 51 15	2,883	82	84	33	br. m. bk. s..	.....do.....	
1512	....do...	15 37 00	147 01 45	2,386	77	84	34	br. m. bk. s..	.....do.....	
1513	....do...	15 55 00	147 09 15	2,864	81	84	34	br. m.....	Red clay...	
1514	....do...	15 39 40	147 22 30	2,721	82	84	34	br. m.....	.....do.....	
1515	....do...	15 57 30	147 26 30	2,762	82	84	35.2	br. m.....	.....do.....	
1516	Nov. 19	15 45 00	147 37 00	3,598	82	84	35	br. m.....	.....do.....	
1517	....do...	15 45 15	147 41 15	3,996	82	84	35.4	br. m. and s.	Volcanic mud.	
1518	....do...	15 45 45	147 48 30	3,198	81	84	35.5	br. m. and s.	.....do.....	
1519	....do...	15 46 20	147 58 15	3,337	83	84	35.4	br. m.....	Red clay ..	
1520	....do...	15 52 00	147 59 00	3,263	83	84	35.6	br. m.....	.....do.....	
1521	....do...	15 46 00	148 09 15	2,981	82	84	35.6	br. m. bk. s ..	Volcanic mud.	
1522	....do...	16 03 40	147 43 30	2,855	81	84	35.4	R	Red clay...	Concretions of clay and manganese.
1523	....do...	16 03 40	147 59 00	2,499	78	84	35.5	R	.....do.....	
1524	Nov. 20	16 03 40	148 14 45	1,587	80	84	36	S	Globigerina ooze.	
1525	....do...	15 59 30	148 17 15	1,585	80	84	36.5	S	.....do.....	

Abstract of the official record of soundings—Continued.

GUAM TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1526	Nov. 20	15 55 30	148 20 15	1,213	81	84	36	S.....	Globigerina ooze.	
1527	....do...	15 51 30	148 23 00	2,106	81	84	35.4	S.....	.....do.....	
1528	....do...	15 47 30	148 26 00	2,391	81	84	35.5	br. m.....	Volcanic mud.	
1529	....do...	15 51 30	148 29 00	1,956	81	84	35	S.....	Globigerina ooze.	
1530	....do...	15 38 00	148 04 00	3,096	81	85	35.6	br. m.....	Red clay...	
1531	....do...	15 35 20	148 13 00	2,462	81	85	35.2	br. m. bk. s ..	Volcanic mud.	
1532	....do...	15 28 20	148 06 40	2,762	82	84	35	br. m. bk. s ..	.....do.....	
1533	....do...	15 26 30	148 17 15	1,731	81	84	35.3	R. G.....	.....	No specimen.
1534	....do...	15 29 00	148 27 15	2,280	82	84	35.5	gy. m. and s. bk. s.	Volcanic mud.	
1535	Nov. 21	15 31 60	148 32 45	2,386	81	84	35.5	br. m.....	Red clay...	
1536	....do...	15 40 30	148 38 45	1,724	81	84	35.6	R	.....	Do.
1537	....do...	15 50 00	148 44 00	1,081	81	84	.....	wh. s.....	Globigerina ooze.	
1538	....do...	15 42 00	148 50 00	1,710	80	84	35	R. S.....	.....do.....	Manganese.
1539	....do...	15 35 30	148 55 45	3,184	83	84	35.5	br. m.....	Red clay...	
1540	....do...	15 30 00	148 50 45	3,191	83	84	35.8	br. m.....	.....do.....	
1541	....do...	15 19 00	148 20 15	1,747	83	84	35.5	G	Globigerina ooze.	Do.
1542	....do...	15 10 40	148 05 45	1,397	79	84	35	gy. s.....	.....do.....	
1543	....do...	15 06 15	148 14 00	2,942	81	84	35.5	br. m.....	Red clay...	
1544	....do...	15 01 40	148 22 15	2,006	79	84	34.8	gy. m. and s.	Globigerina ooze.	
1545	Nov. 22	15 03 45	148 32 30	2,641	76	84	34.6	.....	.....	No specimen
1546	....do...	15 10 30	148 47 30	3,166	78	84	35.4	br. m. bk. s .	Volcanic mud.	
1547	....do...	15 00 00	148 49 45	3,132	78	84	35.1	br. m.....	Red clay...	
1548	....do...	14 50 30	148 52 15	3,108	81	84	35.5	br. m.....	.....do.....	
1549	....do...	15 00 00	149 04 00	3,135	82	84	35.5	br. m.....	.....do.....	
1550	....do...	15 09 00	149 09 30	3,145	80	84	35.4	br. m.....	.....do.....	
1551	....do...	14 59 40	149 18 15	3,169	80	84	35.3	br. m.....	.....do.....	
1552	Nov. 23	14 48 20	149 29 30	3,147	82	84	35.5	br. m.....	.....do.....	
1553	....do...	15 07 15	149 33 30	3,170	84	84	35.4	br. m.....	.....do.....	
1554	....do...	14 54 30	149 51 30	3,101	83	84	35.3	br. m.....	.....do.....	
1555	....do...	15 17 00	149 54 30	3,147	86	85	35.2	br. m.....	.....do.....	
1556	....do...	15 05 15	150 07 45	3,214	82	85	35.5	br. m.....	.....do.....	
1557	....do...	15 26 45	150 09 10	3,182	81	84	.....	br. m.....	.....do.....	
1558	Nov. 24	15 15 30	150 24 00	3,206	80	84	35.6	br. m.....	.....do.....	
1559	....do...	15 36 20	150 25 30	3,217	82	84	35.5	br. m.....	.....do.....	
1560	....do...	15 24 45	150 41 00	3,230	81	84	35.5	br. m.....	.....do.....	
1561	....do...	15 44 00	150 47 30	3,240	82	85	35.6	br. m.....	.....do.....	
1562	....do...	15 27 00	151 06 30	3,344	82	85	35.4	br. m.....	.....do.....	
1563	....do...	15 46 00	151 09 00	3,266	84	84	35.6	br. m.....	.....do.....	
1564	....do...	15 30 40	151 24 15	3,177	80	83	35.7	br. m.....	.....do.....	
1565	Nov. 25	15 49 15	151 28 45	3,289	80	83	35.8	br. m.....	.....do.....	
1566	....do...	15 34 45	151 43 30	2,561	83	83	36	br. m.....	.....do.....	
1567	....do...	15 38 40	151 45 15	2,672	85	83	35.5	br. m.....	.....do.....	
1568	....do...	15 53 30	151 48 30	2,946	82	84	35.5	br. m.....	.....do.....	
1569	....do...	16 07 00	151 52 30	825	81	84	39	Co. s. and m.	Globigerina ooze.	
1570	....do...	16 04 20	151 53 30	815	81	84	39	Co. s. and m.	.....do.....	
1571	....do...	16 01 40	151 54 30	1,348	81	84	36.8	Co. s. and m.	.....do.....	
1572	....do...	15 59 00	151 55 30	1,892	82	84	35.7	Co. s. m. and G.	.....do.....	Manganese.
1573	....do...	15 51 00	151 58 45	2,676	81	84	35.7	br. m.....	Red clay...	
1574	....do...	15 51 30	152 04 00	2,757	81	84	35.5	br. m.....	.....do.....	
1575	....do...	15 52 15	152 09 15	2,904	81	83	35.5	br. m.....	.....do.....	
1576	Nov. 26	15 56 00	152 08 30	2,978	80	83	35.7	br. m.....	.....do.....	
1577	....do...	16 00 00	152 08 00	2,957	80	83	35.9	br. m.....	.....do.....	
1578	....do...	16 03 45	152 07 15	2,778	80	83	.....	.....	.....	No specimen.
1579	....do...	16 07 30	152 06 45	3,122	80	83	35	br. m.....	Red clay...	
1580	....do...	16 11 30	152 05 45	3,121	81	84	35	br. m.....	.....do.....	
1581	....do...	16 10 45	152 10 00	3,175	82	84	35	br. m.....	.....do.....	
1582	....do...	16 00 00	152 20 15	3,165	86	85	35	br. m.....	.....do.....	
1583	....do...	15 44 30	152 04 00	777	85	85	37.5	wh. s. and m.	Globigerina ooze.	
1584	....do...	16 15 00	152 23 15	3,239	81	84	35	br. m.....	Red clay...	
1585	....do...	16 09 00	152 29 15	3,200	80	84	35	br. m.....	.....do.....	
1586	Nov. 27	16 01 30	152 37 30	3,190	81	83	35	br. m.....	.....do.....	
1587	....do...	16 14 30	152 37 00	3,219	80	83	35	br. m.....	.....do.....	
1588	....do...	16 24 00	152 34 45	3,288	81	83	34.8	br. m.....	.....do.....	
1589	....do...	16 20 30	152 43 45	3,206	82	84	35	br. m.....	.....do.....	

Abstract of the official record of soundings—Continued.

GUAM TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1590	Nov. 27	16 26 15	152 51 45	3,195	83	85	35.2	br. m.....	Red clay...	
1591	....do...	16 36 00	152 50 15	3,180	82	84	34.5	br. m.....	.....do.....	
1592	....do...	16 32 30	153 00 15	3,197	81	84	35	br. m.....	.....do.....	
1593	....do...	16 38 20	153 08 00	3,195	81	84	34.8	br. m.....	.....do.....	
1594	....do...	16 48 00	153 06 00	3,194	81	84	35.2	br. m.....	.....do.....	
1595	Nov. 28	16 44 00	153 16 30	3,193	80	83	35.2	br. m.....	.....do.....	
1596	....do...	16 50 15	153 24 00	3,195	79	83	35	br. m.....	.....do.....	
1597	....do...	16 58 30	153 22 45	3,191	81	83	35	br. m.....	.....do.....	
1598	....do...	16 54 00	153 44 15	2,905	81	84	35	br. m.....	.....do.....	
1599	....do...	17 03 30	153 45 00	3,055	79	84	35	br. m.....	.....do.....	
1600	....do...	17 13 30	153 47 15	3,110	81	84	35.2	yl. m.....	.....do.....	Minute specimen mostly diatoms.
1601	....do...	17 10 45	153 57 00	1,733	81	84	35	gy. s.....	Globigerina ooze.	
1602	....do...	17 15 45	153 55 15	2,059	81	84	35	yl. m.....	.....	No specimen.
1603	....do...	17 21 30	153 53 30	1,733	80	84	35	gy. s. and m .	Globigerina ooze.	
1604	....do...	17 22 30	153 48 45	2,923	82	83	35	br. m.....	Red clay...	
1605	Nov. 29	17 23 30	153 44 15	3,185	81	83	35.2	br. m.....	.....do.....	
1606	....do...	17 29 45	153 45 15	3,185	81	83	35.2	br. m.....	.....do.....	
1607	....do...	17 50 30	153 47 15	3,138	81	83	35.2	br. m.....	.....do.....	
1608	....do...	17 36 00	154 03 15	3,122	82	84	35	br. m.....	.....do.....	
1609	....do...	17 52 00	154 07 15	3,115	82	83	35	br. m.....	.....do.....	
1610	....do...	17 36 45	154 21 00	2,977	81	83	35.2	br. m.....	.....do.....	
1611	....do...	17 53 40	154 26 00	2,998	81	83	35	br. m.....	.....	Do.
1612	Nov. 30	17 45 30	154 41 00	3,065	80	83	34.5	br. m.....	Red clay...	
1613	....do...	17 55 00	154 46 00	3,102	80	83	35.2	br. m.....	.....do.....	
1614	....do...	17 47 00	154 51 30	3,065	81	83	35.2	br. m	.....do.....	
1615	....do...	17 39 15	154 57 00	3,112	81	83	35	br. m.....	.....do.....	
1616	....do...	17 47 00	155 02 00	3,084	81	83	34	br. m.....	.....do.....	
1617	....do...	17 55 45	155 06 45	3,182	81	83	.....	br. m.....	.....do.....	
1618	....do...	17 47 30	155 12 40	3,138	80	83	.....	br. m.....	.....do.....	
1619	....do...	17 47 30	155 23 00	3,122	80	83	35	br. m.....	.....do.....	
1620	....do...	17 56 00	155 28 00	3,143	78	83	35.1	br. m.....	.....do.....	
1621	Dec. 1	17 47 15	155 33 30	3,133	80	83	35.5	br. m.....	.....do....	
1622	....do...	17 37 15	155 43 45	3,185	80	83	35.6	br. m.....	.....do.....	
1623	....do...	17 57 00	155 48 00	3,164	81	83	35.3	br. m.....	.....do.....	
1624	....do...	17 44 30	156 03 15	3,206	79	83	35.2	br. m.....	.....do.....	
1625	....do...	18 05 40	156 08 45	3,135	81	83	35.5	br. m.....	.....do.....	
1626	....do...	17 54 15	156 25 30	3,193	80	83	35.2	br. m.....	.....do.....	
1627	Dec. 2	18 15 30	156 30 15	3,159	81	83	35.4	br. m.....	.....do.....	
1628	....do...	18 02 45	156 45 15	3,164	81	83	35	br. m.....	.....do.....	
1629	....do...	18 23 00	156 52 15	3,188	80	83	35.6	br. m.....	.....do.....	
1630	....do...	18 05 00	157 09 15	3,164	80	83	35.2	br. m.....	.....do.....	
1631	....do...	18 23 15	157 15 15	3,159	81	83	35.8	br. m.....	.....do.....	
1632	....do...	18 08 40	157 29 45	3,168	79	83	35.8	br. m.....	.....do.....	
1633	Dec. 3	18 26 40	157 36 00	3,173	80	82	35.2	br. m.....	.....do.....	
1634	....do...	18 12 00	157 51 00	3,190	80	82	35	br. m.....	.....do.....	
1635	....do...	18 32 30	157 54 45	3,164	82	83	35.5	br. m.....	.....	Do.
1636	....do...	18 20 45	158 11 45	3,185	82	83	35.5	br. m.....	Red clay...	
1637	....do...	18 39 20	158 16 15	3,159	78	82	.....	.....	.....	Do.
1638	Dec. 4	18 25 30	158 31 30	3,163	80	83	35	br. m.....	Red clay...	
1639	....do...	18 46 00	158 37 30	3,106	79	83	35.2	br. m.....	.....do.....	
1640	....do...	18 31 00	158 53 15	3,170	81	83	35.2	br. m.....	.....do.....	
1641	....do...	18 50 00	158 58 30	3,158	80	83	35	br. m.....	.....do.....	
1642	....do...	18 54 00	159 14 30	3,130	80	83	34.5	br. m.....	.....do.....	
1643	....do...	18 52 30	159 20 00	3,148	79	82	35.3	br. m.....	.....do.....	
1644	....do...	18 38 00	159 35 30	3,218	79	82	.....	br. m.....	.....do.....	
1645	Dec. 5	18 56 30	159 40 00	3,164	79	82	.....	br. m.....	.....do.....	
1646	....do...	18 42 00	159 56 45	3,131	80	82	35	br. m.....	.....do.....	
1647	....do...	19 00 30	160 01 30	3,150	80	82	35	br. m.....	.....do.....	
1648	....do...	18 51 15	160 15 30	3,126	80	82	35	br. m.....	.....do.....	
1649	....do...	19 16 40	160 14 45	2,769	79	82	35	br. m.....	.....do.....	
1650	Dec. 6	19 07 00	160 30 45	3,038	80	82	35	br. m.....	.....do.....	
1651	....do...	19 22 00	160 34 30	2,567	79	82	35	br. m.....	.....do.....	
1652	....do...	19 23 00	160 44 30	2,886	79	82	35	br. m.....	.....do.....	
1653	....do...	19 32 00	160 40 15	2,584	80	82	.....	br. m.....	.....do.....	
1654	....do...	19 40 30	160 44 45	2,673	80	82	.....	br. m.....	.....do.....	
1655	....do...	19 40 30	160 55 45	2,912	80	83	35	br. m.....	.....do.....	
1656	....do...	19 48 00	160 51 30	2,859	81	83	35	br. m.....	.....do.....	
1657	....do...	19 54 45	160 58 30	2,854	80	83	35	br. m.....	.....do.....	
1658	....do...	19 54 00	161 09 15	2,912	79	83	.....	br. m.....	.....do.....	
1659	....do...	20 04 00	161 06 30	2,468	79	82	.....	.....	.....	Do.
1660	Dec. 7	20 11 45	161 13 00	2,270	79	82	.....	.....	.....	Do.
1661	....do...	20 10 30	161 24 15	2,751	79	82	.....	br. m.....	Red clay...	

Abstract of the official record of soundings—Continued.

GUAM TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1662	Dec. 7	20 20 30	161 21 00	2,596	78	82	.....	br. m. and s.	Red clay...	
1663	....do...	20 30 30	161 18 00	2,552	79	82	.....	br. m.....	.....do.....	
1664	....do...	20 29 00	161 28 45	2,788	81	82	34.2	br. m.....	.....do.....	
1665	....do...	20 27 00	161 39 45	2,827	79	82	35	br. m.....	.....do.....	
1666	....do...	20 34 53	161 37 30	2,848	79	82	.....	br. m.....	.....do.....	
1667	....do...	20 40 00	161 46 30	2,817	79	82	36	br. m.....	.....do.....	
1668	....do...	20 35 30	161 56 00	2,807	79	82	35	br. m.....	.....do.....	
1669	....do...	20 45 20	161 55 45	2,816	79	82	.....	br. m.....	.....do.....	
1670	Dec. 8	20 51 00	162 05 00	2,838	79	82	35	br. m.....	.....do.....	
1671	....do...	20 46 20	162 14 30	2,817	78	81	.....	br. m.....	.....	No specimen.
1672	....do...	20 56 40	162 14 30	2,819	78	81	.....	br. m.....	Red clay...	
1673	....do...	21 08 00	162 14 30	2,815	80	82	.....	br. m.....	.....do.....	
1674	....do...	20 58 30	162 33 30	2,832	79	82	.....	br. m.....	.....do.....	
1675	....do...	21 14 45	162 41 30	2,114	80	82	35	br. m. and s.	.....do.....	
1676	....do...	21 11 40	162 45 15	1,087	79	82	.....	wh. m. gy. s.	Globigerina ooze.	
1677	....do...	21 10 30	162 47 15	1,054	79	82	37.3	gy. m. and s.	.....do.....	
1678	....do...	21 08 00	162 49 45	1,283	78	82	38	gy. m. and s.	.....do.....	
1679	....do...	21 03 45	162 53 00	2,203	78	82	.....	br. m. and s.	.....	Do.
1680	....do...	20 59 00	162 56 15	2,451	78	82	35	br. m.....	Red clay...	
1681	....do...	20 54 40	162 59 45	2,498	79	81	.....	br. m.....	.....do.....	
1682	Dec. 9	20 58 20	163 03 15	2,270	78	81	35.1	br. m.....	.....do.....	
1683	....do...	21 02 00	163 06 45	1,798	78	81	35.2	gy. m	Globigerina ooze.	
1684	....do...	21 05 45	163 10 30	828	78	81	37	gy. s.....	.....do.....	
1685	....do...	21 01 40	163 14 15	1,507	78	81	.....	gy. s.....	.....do.....	
1686	....do...	20 57 30	163 17 45	2,003	78	81	35.2	gy. s.....	.....do.....	
1687	....do...	20 53 00	163 20 30	2,435	78	81	.....	br. m.....	Red clay...	
1688	....do...	20 48 00	163 21 15	2,630	80	82	35	br. m.....	.....do.....	
1689	....do...	20 55 30	163 28 45	2,556	83	82	.....	br. m.....	.....do.....	
1690	....do...	21 01 00	163 27 45	1,992	79	82	.....	br. m. and s.	Globigerina ooze.	
1691	....do...	21 06 15	163 26 45	1,912	79	82	35	gy. m. and s.	.....do.....	
1692	....do...	21 14 40	163 18 15	754	79	82	.....	gy. m. and s.	.....do.....	
1693	....do...	21 23 00	163 10 00	2,050	77	82	35	gy. s.....	.....do.....	
1694	....do...	21 26 40	163 06 00	2,272	77	81	.....	br. m.....	Red clay...	
1695	....do...	21 29 45	163 02 45	2,377	79	81	35	br. m.....	.....do.....	
1696	....do...	21 33 00	162 59 00	2,050	78	81	35	gy. m	Globigerina ooze.	
1697	Dec. 10	21 36 20	162 55 30	2,103	79	81	35	wh. and bk. s.	.....do.....	
1698	....do...	21 30 40	162 55 15	2,093	78	81	35.2	gy. m	.....do.....	
1699	....do...	21 28 30	162 55 00	1,456	77	80	.....	gy. m. and s.	.....do.....	
1700	....do...	21 20 00	162 54 45	1,917	78	80	.....	gy. m. and s.	.....do.....	
1701	....do...	21 22 40	162 50 40	1,352	76	80	.....	gy. m. and s.	.....do.....	
1702	....do...	21 24 45	162 46 40	1,854	75	81	.....	gy. m. and s.	.....do.....	
1703	....do...	21 27 00	162 43 00	2,731	76	81	.....	br. m.....	Red clay...	
1704	....do...	21 21 00	162 42 00	1,879	79	81	.....	gy. m. and s. and G.	Globigerina ooze.	Large manganese nodule.
1705	....do...	21 15 15	162 41 00	1,083	78	81	.....	gy. m. and s.	.....do.....	
1706	....do...	21 13 00	162 44 40	1,061	79	81	36	gy. m	.....do.....	
1707	....do...	21 16 00	162 38 00	2,029	79	81	35	gy. m	.....do.....	
1708	....do...	21 19 15	162 33 30	2,953	79	82	.....	.....	.....	No specimen.
1709	....do...	21 13 30	162 27 45	2,900	78	82	.....	br. m.....	Red clay...	
1710	....do...	21 07 40	162 22 20	2,867	78	81	.....	br. m.....	Diatom ooze.	Coscinodiscus rex.
1711	....do...	21 16 45	162 17 45	2,827	78	81	.....	br. m.....	Red clay...	
1712	Dec. 11	21 24 15	162 24 00	2,879	78	81	.....	.....	.....	No specimen.
1713	....do...	21 27 00	162 34 00	2,879	77	80	.....	br. m.....	Red clay...	
1714	....do...	21 37 00	162 33 00	2,808	77	80	.....	br. m.....	.....do.....	
1715	....do...	21 35 15	162 43 00	2,912	79	81	.....	br. m.....	.....do.....	
1716	....do...	21 38 20	162 50 00	2,881	78	81	.....	br. m.....	.....do.....	
1717	....do...	21 47 00	162 45 20	2,570	78	81	.....	br. m.....	.....do.....	
1718	....do...	21 43 30	162 49 45	2,854	78	81	.....	br. m.....	.....do.....	
1719	....do...	21 41 40	162 57 00	2,830	78	81	.....	br. m.....	.....do.....	
1720	....do...	21 46 30	162 57 00	2,798	78	81	.....	br. m.....	.....do.....	
1721	....do...	21 56 45	162 57 00	2,890	77	80	.....	br. m.....	.....do.....	
1722	....do...	21 48 30	163 01 15	2,831	76	80	.....	br. m.....	.....do.....	
1723	Dec. 12	21 44 00	163 03 15	2,774	77	81	.....	br. m.....	.....do.....	
1724	....do...	21 39 15	163 05 30	2,676	77	81	.....	gy. m	Diatom ooze.	Coscinodiscus rex.
1725	....do...	21 43 30	163 07 00	2,628	77	81	.....	br. m.....	Red clay...	
1726	....do...	21 48 00	163 09 00	2,120	78	81	.....	br. m.....	.....do.....	
1727	....do...	21 52 00	163 10 45	2,360	79	81	.....	br. m.....	.....do.....	
1728	....do...	21 56 30	163 11 30	2,868	79	81	.....	br. m.....	.....do.....	
1729	....do...	22 01 45	163 11 30	2,935	79	81	.....	br. m.....	.....do.....	

"No reliable thermometer."

Abstract of the official record of soundings—Continued.

GUAM TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1730	Dec. 12	21 53 30	163 16 15	1,900	79	81	.....	gy. m	Globigernia ooze.	
1731	....do...	21 58 00	163 20 45	2,649	81	81	.....	br. m.....	Red clay...	
1732	....do...	21 46 45	163 21 15	2,241	79	81	.....	br. m.....	.....do.....	
1733	....do...	21 40 20	163 20 30	2,672	79	81	.....	br. m.....	.....do.....	
1734	....do...	21 35 00	163 20 00	2,738	78	81	.....	br. m.....	.....do.....	
1735	....do...	21 29 20	163 19 15	2,612	78	80	.....	br. m.....	.....do.....	
1736	....do...	21 33 20	163 24 00	2,775	78	80	.....	br. m.....	.....do.....	
1737	Dec. 13	21 37 20	163 28 40	2,876	78	80	.....	br. m.....	.....do.....	
1738	....do...	21 41 00	163 33 20	2,943	78	80	.....	br. m.....	.....do.....	
1739	....do...	21 45 20	163 37 45	2,966	78	80	.....	br. m.....	.....do.....	
1740	....do...	21 39 20	163 38 45	2,950	80	81	.....	br. m.....	.....do.....	
1741	....do...	21 34 00	163 39 45	2,945	80	81	.....	br. m.....	.....do.....	
1742	....do...	21 33 40	163 13 00	2,395	80	81	.....	br. m.....	.....do.....	
1743	....do...	21 39 30	163 11 30	2,289	79	81	.....	br. m.....	.....do.....	
1744	....do...	21 45 30	163 10 30	2,299	79	81	.....	br. m.....	.....do.....	
1745	....do...	21 47 30	163 14 20	1,696	79	81	.....	gy. m. and s.	Globigerina ooze.	
1746	....do...	21 43 30	163 13 45	1,973	78	81	.....	bk. and wh. s.and bk.G.	.....do.....	Manganese.
1747	....do..	21 39 15	163 13 20	2,225	78	81	.....	br. m.....	Red clay...	
1748	Dec. 14	21 41 30	163 56 15	3,033	78	80	.....	br. m.....	.....do.....	
1749	....do...	21 47 00	164 05 15	2,967	77	80	.....	br. m.....	.....do.....	
1750	....do...	21 42 00	164 10 15	2,974	78	81	.....	br. m.....	.....do.....	
1751	....do...	21 31 00	164 26 30	3,021	78	81	.....	br. m.....	.....do.....	
1752	....do...	21 51 30	163 58 30	3,000	78	82	.....	br. m.....	.....do.....	
1753	....do...	21 56 15	164 16 45	2,902	77	82	.....	br. m.....	.....do.....	
1754	....do...	21 44 30	164 34 45	3,029	77	80	.....	br. m.....	.....do.....	
1755	Dec. 15	22 05 15	164 39 45	3,036	77	80	.....	br. m.....	.....do.....	
1756	....do...	21 53 15	164 57 15	3,018	76	80	.....	br. m.....	.....do.....	
1757	....do...	22 13 45	165 02 00	3,085	80	81	.....	br. m.....	.....do.....	
1758	....do...	22 01 30	165 22 20	3,078	82	82	.....	br. m.....	.....do.....	
1759	....do...	22 20 00	165 20 20	3,107	78	82	.....	br. m.....	.....do.....	
1760	....do...	22 05 30	165 33 45	3,070	77	82	.....	br. m.....	.....do.....	
1761	....do...	22 25 30	165 35 15	3,234	76	81	.....	br. m.....	.....do.....	
1762	Dec. 16	22 10 45	165 47 15	3,198	76	80	.....	br. m.....	.....do.....	
1763	....do...	22 30 45	165 49 30	3,229	78	81	.....	br. m.....	.....do.....	
1764	....do...	22 12 20	166 88 30	3,227	78	81	.....	br. m.....	.....do.....	
1765	....do...	22 28 20	166 10 30	3,126	78	82	.....	.....	.....	No specimen.
1766	....do...	22 13 30	166 26 30	3,237	79	82	.....	br. m.....	.....do.....	
1767	....do...	22 32 40	166 31 45	3,269	79	81	.....	br. m.....	.....do.....	
1768	Dec. 17	22 17 00	166 47 00	3,235	79	80	.....	br. m.....	.....do.....	
1769	....do...	22 36 40	166 52 45	3,228	75	80	.....	br. m.....	.....do.....	
1770	....do...	22 20 20	167 10 00	3,206	77	80	.....	br. m.....	.....do.....	
1771	....do...	22 44 40	167 13 00	3,261	74	80	.....	br. m.....	.....do.....	
1772	....do...	22 32 45	167 21 45	3,208	75	80	.....	br. m.....	.....do.....	
1773	....do...	22 50 30	167 26 00	3,321	73	79	.....	br. m.....	.....do.....	
1774	Dec. 18	22 38 30	167 41 45	3,164	74	79	.....	br. m.....	.....do.....	
1775	....do...	22 59 00	167 48 30	3,310	71	78	.....	.....	.....	Do.
1776	....do...	22 46 30	168 02 00	3,379	73	79	.....	br. m.....	Red clay ..	
1777	....do...	22 59 00	168 03 00	3,261	73	80	.....	br. m.....	.....do.....	
1778	....do...	22 46 15	168 15 45	3,298	73	79	.....	br. m.....	.....do.....	
1779	....do...	23 05 00	168 16 45	3,207	72	78	.....	br. m.....	.....do.....	
1780	....do...	22 53 20	168 34 00	3,169	71	78	.....	br. m.....	.....do.....	
1781	Dec 19	23 12 15	168 35 40	3,251	72	78	.....	br. m.....	.....do.....	
1782	....do...	23 00 15	168 52 45	3,119	71	77	.....	br. m.....	.....do.....	
1783	....do...	23 18 30	168 54 15	3,221	73	80	.....	br. m.....	.....do.....	
1784	....do...	23 09 00	169 07 15	3,256	73	80	.....	br. m.....	.....do.....	
1785	....do...	23 28 40	169 12 30	3,288	73	80	.....	br. m.....	.....do.....	
1786	....do...	23 18 30	169 30 15	3,238	72	79	.....	br. m.....	.....	Do.
1787	....do...	23 37 40	169 34 30	3,320	72	78	.....	br. m.....	Red clay ..	
1788	Dec. 20	23 28 00	169 54 30	3,318	73	77	.....	br. m.....	.....do.....	
1789	....do...	23 47 30	169 56 00	3,331	75	78	.....	br. m.....	.....do.....	
1790	....do...	23 38 00	170 11 45	3,288	77	79	.....	br. m.....	.....do.....	
1791	....do...	24 05 00	170 07 20	3,243	76	79	.....	br. m.....	.....do.....	
1792	....do...	23 49 30	170 29 20	3,247	75	79	.....	br. m.....	.....do.....	
1793	....do...	24 05 40	170 35 00	3,273	73	78	.....	.....	.....	Do.
1794	Dec. 21	23 54 20	170 56 00	3,250	72	77	.....	.....	.....	Do.
1795	....do...	24 09 45	171 00 45	3,257	69	76	.....	br. m.....	Red clay ..	
1796	....do...	24 15 15	170 56 30	3,257	69	76	.....	br. m.....	.....do.....	
1797	....do...	24 11 00	171 11 15	3,265	70	76	.....	br. m.....	.....do.....	
1798	....do...	24 34 00	171 06 30	3,252	69	76	.....	br. m.....	.....do.....	
1799	....do...	24 21 00	171 29 15	3,196	70	76	.....	br. m.....	.....do.....	
1800	Dec. 22	24 39 45	171 30 00	3,214	68	75	.....	br. m.....	.....do.....	
1801	....do...	24 30 30	171 51 40	3,206	68	75	.....	br. m.....	.....do.....	
1802	....do...	24 49 30	171 49 40	3,281	68	75	.....	br. m.....	.....do.....	
1803	....do...	24 37 30	172 08 40	3,198	69	76	.....	br. m.....	.....do.....	

Abstract of the official record of soundings—Continued.

GUAM TO MIDWAY ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude east.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1899.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1804	Dec. 22	24 55 20	172 11 00	3,225	67	75	.....	br. m.....	Red clay...	
1805	....do...	24 45 20	172 29 00	3,258	68	75	.....	br. m.....	.....do.....	
1806	....do...	25 07 00	172 32 20	3,432	69	75	.....	br. m.....	.....do.....	
1807	Dec. 23	24 55 30	172 50 00	3,237	68	75	.....	br. m.....	.....do.....	
1808	....do...	24 47 15	172 53 30	3,202	68	76	.....	br. m.....	.....do.....	
1809	....do...	25 08 40	172 56 30	3,208	68	76	.....	br. m.....	.....do.....	
1810	....do...	24 56 45	173 13 15	3,156	69	75	.....	br. m.....	.....do.....	
1811	....do...	25 17 00	173 17 45	3,227	69	75	.....	br. m.....	.....do.....	
1812	Dec. 24	25 05 00	173 34 30	3,206	68	75	.....	br. m.....	.....do.....	
1813	....do...	25 25 30	173 38 45	3,231	68	75	.....	br. m.....	.....do.....	
1814	....do...	25 13 30	173 55 00	3,258	70	76	.....	br. m.....	.....do.....	
1815	....do...	25 26 40	173 55 30	3,283	70	75	.....	br. m.....	.....do.....	
1816	....do...	25 14 30	174 13 00	3,257	70	75	.....	br. m.....	.....do.....	
1817	....do...	25 35 00	174 20 00	3,257	67	74	.....	br. m.....	.....do.....	
1818	Dec. 25	25 23 00	174 36 30	3,208	69	75	.....	br. m.....	.....do.....	
1819	....do...	25 44 15	174 43 30	3,475	70	75	.....	br. m.....	.....do.....	
1820	....do...	25 26 00	175 01 15	3,258	72	75	.....	br. m.....	.....do.....	
1821	Dec. 26	25 47 30	175 12 00	3,434	78	75	.....	br. m.....	.....do.....	
1822	Dec. 28	26 01 00	175 47 00	3,252	68	74	.....	br. m.....	.....do.....	
1823	....do...	25 54 40	175 30 00	3,227	69	75	.....	br. m.....	.....do.....	
1824	....do...	25 36 00	175 23 45	3,276	68	75	.....	br. m.....	.....do.....	
1825	....do...	25 39 30	175 43 15	3,292	70	75	.....	br. m.....	.....do.....	
1826	Dec. 29	25 46 15	176 05 00	3,033	69	75	.....	br. m.....	.....do.....	
1827	....do...	26 06 40	176 09 20	3,357	67	73	.....	br. m.....	.....do.....	
1828	....do...	25 54 00	176 26 30	3,230	69	73	.....	br. m.....	.....do.....	
1829	....do...	26 14 00	176 30 00	3,242	70	75	.....	br. m.....	.....do.....	
1830	....do...	26 02 30	176 46 20	3,194	70	74	.....	br. m.....	.....do.....	
1831	Dec. 30	26 24 00	176 49 30	3,119	70	75	.....	br. m.....	.....do.....	
1832	....do...	26 12 45	177 06 00	3,086	70	75	.....	br. m.....	.....do.....	
1833	....do...	26 34 00	177 09 00	3,074	72	75	.....	br. m.....	.....do.....	
1834	....do...	26 17 00	177 32 15	3,229	70	75	.....	br. m.....	.....do.....	
1835	....do...	26 38 20	177 31 15	3,061	67	75	.....	br. m.....	.....do.....	
1836	....do...	26 18 30	177 48 15	3,013	67	75	.....	br. m.....	.....do.....	
1837	Dec. 31	26 37 40	177 52 45	3,115	63	75	.....	br. m.....	.....do.....	
1838	....do...	26 24 00	178 09 15	3,105	67	74	.....	br. m.....	.....do.....	
1839	....do...	26 43 30	178 14 30	3,047	63	74	.....	br. m.....	.....do.....	
1840	....do...	26 29 45	178 33 30	2,876	72	74	.....	br. m.....	.....do.....	
1841	....do...	26 49 30	178 39 00	3,007	63	72	.....	br. m.....	.....do.....	
1842	....do...	26 36 15	178 56 30	3,078	64	73	.....	br. m.....	.....do.....	
	1900.									
1843	Jan. 1	26 55 45	179 02 45	3,022	65	72	.....	br. m.....	.....do.....	
1844	....do...	26 43 15	179 20 30	3,038	66	72	.....	br. m.....	.....do.....	
1845	....do...	27 02 45	179 27 00	2,951	70	73	.....	br. m.....	.....do.....	
1846	....do...	26 47 45	179 43 45	2,970	68	71	.....	br. m.....	.....do.....	
1847	....do...	27 06 40	179 50 30 West.	2,993	68	71	.....	br. m.....	.....do.....	
1848	....do...	26 52 00	179 55 30	2,947	66	71	.....	br. m.....	.....do.....	
1849	....do...	27 10 30	179 46 00	2,939	65	70	.....	br. m.....	.....do.....	
1850	....do...	26 55 40	179 34 00	3,036	65	70	.....	br. m.....	.....do.....	
1851	....do...	27 13 15	179 22 30	2,951	64	70	.....	br. m.....	.....do.....	
1852	....do...	26 58 30	179 12 30	2,951	65	71	.....	br. m.....	.....do.....	
1853	....do...	27 16 45	179 06 00	2,915	64	70	.....	br. m.....	.....do.....	
1854	....do...	27 02 00	178 51 30	2,997	67	70	.....	br. m.....	.....do.....	
1855	....do...	27 21 15	178 46 30	2,895	64	68	.....	br. m.....	.....do.....	
1856	Jan. 2	27 06 30	178 30 15	2,859	69	68	.....	br. m.....	.....do.....	
1857	....do...	27 26 45	178 25 30	2,772	65	67	.....	br. m.....	.....do.....	
1858	....do...	27 12 00	178 10 00	2,757	69	70	.....	br. m.....	.....do.....	
1859	....do...	27 30 00	178 04 15	2,437	67	70	.....	br. m.....	.....do.....	
1860	....do...	27 11 30	177 56 00	2,734	67	70	.....	br. m.....	.....do.....	
1861	....do...	27 21 00	177 37 00	2,737	67	70	.....	br. m.....	.....do.....	
1862	Jan. 3	27 33 00	177 48 30	2,462	66	70	.....	br. m.....	.....do.....	
1863	....do...	27 44 15	177 25 30	2,470	67	70	.....	br. m.....	.....do.....	
1864	....do...	27 53 00	177 25 45	2,224	67	69	.....	gy. m	Globigerina ooze.	
1865	....do...	27 57 00	177 15 30	2,185	69	69	.....	gy. m	.....	No specimen.
1866	....do...	28 07 00	177 22 15	1,503	66	70	.....	g.....	Globigerina ooze.	Manganese.
1867	....do...	27 57 00	177 34 00	2,311	68	68	.....	gy. m	.....do.....	
1868	....do...	28 05 00	177 32 00	1,624	67	66	.....	gy. m. and s.	.....do.....	
1869	....do...	28 10 00	177 26 30	57	67	66	.....	.....	.....	No specimen.
1870	....do...	28 10 30	177 31 15	1,618	66	66	.....	gy. m. and s.	Globigerina ooze.	
1871	....do...	28 17 30	177 28 15	325	67	66	.....	.....	.....	Nospecimen, Midway Islands.

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO HAWAIIAN ISLANDS.

Station No.	Date.	Latitude north.	Longitude west.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1900.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1872	Jan. 3	28 22 20	177 30 00	741	66	66	.....	gy. m. and s.	Globigerina ooze.	
1873	....do...	28 27 00	177 31 45	1,767	66	66	.....	gm. m. and s.	.....do.....	
1874	....do...	28 27 20	177 13 30	2,188	66	66	.....	gm. m. and s.	.....do.....	
1875	Jan. 4	28 45 15	177 29 45	2,884	64	65	.....	br. m.....	Red clay...	
1876	....do...	28 43 30	177 15 30	2,887	63	66	.....	br. m.....	.....do.....	
1877	....do...	28 51 20	177 07 30	2,941	62	66	.....	br. m.....	.....do.....	
1878	....do...	29 00 20	177 14 00	3,043	62	66	.....	br. m.....	.....do.....	
1879	....do...	28 57 20	176 59 30	2,973	63	69	.....	br. m.....	.....do.....	
1880	....do...	29 00 45	176 49 00	2,943	63	69	.....	br. m.....	.....do.....	
1881	....do...	29 08 45	176 54 15	3,002	64	68	.....	br. m.....	.....do.....	
1882	....do...	29 03 00	176 38 00	2,951	61	68	.....	br. m.....	.....do.....	
1883	Jan. 5	29 11 00	176 32 30	2,978	62	67	.....	br. m.....	.....do.....	
1884	....do...	29 00 30	176 27 30	2,936	63	69	.....	br. m.....	.....do.....	
1885	....do...	28 51 20	176 25 45	2,797	62	69	.....	br. m.....	.....do.....	
1886	....do...	28 57 30	176 17 15	2,871	66	68	.....	br. m.....	.....do.....	
1887	....do...	29 05 30	176 11 30	2,891	66	70	.....	br. m.....	.....do.....	
1888	....do...	28 54 20	176 07 00	2,787	66	69	.....	br. m.....	.....do.....	
1889	....do...	28 55 00	175 54 00	2,818	67	70	.....	br. m.....	.....do.....	
1890	....do...	28 46 30	175 55 15	2,754	67	69	.....	br. m.....	.....do.....	
1891	....do...	28 32 15	175 51 00	2,655	69	69	.....	br. m.....	.....do.....	
1892	Jan. 8	28 49 40	175 32 15	2,797	64	69	.....	br. m.....	.....do.....	Jan. 6 and 7, "Riding out gale."
1893	....do...	28 26 45	175 28 30	2,576	67	69	.....	br. m.....	.....do.....	
1894	....do...	28 41 15	175 13 45	2,860	68	69	.....	br. m.....	.....do.....	
1895	....do...	28 21 00	175 09 00	2,838	67	69	.....	br. m.....	.....do.....	
1896	Jan. 9	28 35 20	174 54 00	2,952	69	69	.....	br. m.....	.....do.....	
1897	....do...	28 15 15	174 49 00	2,931	68	69	.....	br. m.....	.....do.....	
1898	....do...	28 30 00	174 34 15	2,951	69	69	.....	br. m.....	.....do.....	
1899	....do...	28 11 20	174 27 30	3,035	71	68	.....	br. m.....	.....do.....	
1900	....do...	28 24 30	174 12 30	2,956	69	68	.....	br. m.....	.....do.....	
1901	....do...	28 02 45	174 08 15	2,952	68	67	.....	br. m.....	.....do.....	
1902	Jan. 10	28 12 45	173 48 00	2,983	68	67	.....	br. m.....	.....do.....	
1903	....do...	27 51 00	173 44 00	3,020	65	67	.....	br. m.....	.....do.....	
1904	....do...	28 01 15	173 24 15	2,887	64	67	.....	br. m.....	.....do.....	
1905	....do...	27 46 30	173 22 45	2,914	67	66	.....	br. m.....	.....do.....	
1906	....do...	27 59 20	173 03 20	2,810	63	66	.....	br. m.....	.....do.....	
1907	....do...	27 40 30	173 01 00	2,797	63	66	.....	br. m.....	.....do.....	
1908	Jan. 11	27 54 15	172 41 45	2,774	64	65	.....	br. m.....	.....do.....	
1909	....do...	27 35 30	172 36 45	2,764	65	66	.....	br. m.....	.....do.....	
1910	....do...	27 47 00	172 22 45	2,746	66	68	.....	br. m.....	.....do.....	
1911	....do...	27 26 00	172 18 30	2,746	67	71	.....	br. m.....	.....do.....	
1912	....do...	27 39 00	172 02 45	2,732	67	70	.....	br. m.....	.....do.....	
1913	....do...	27 18 30	171 58 15	2,727	69	70	.....	br. m.....	.....do.....	
1914	Jan. 12	27 31 45	171 41 15	2,710	70	70	.....	br. m.....	.....do.....	
1915	....do...	27 11 40	171 37 00	2,710	71	70	.....	br. m.....	.....do.....	
1916	....do...	27 25 00	171 21 30	2,689	71	71	.....	br. m.....	.....do.....	
1917	....do...	27 05 30	171 16 30	2,731	73	71	.....	br. m.....	.....do.....	
1918	....do...	27 18 45	170 58 15	2,603	74	72	.....	br. m.....	.....do.....	
1919	....do...	27 08 20	170 56 00	2,607	71	71	.....	br. m.....	.....do.....	
1920	....do...	27 15 15	170 48 15	2,581	71	71	.....	br. m.....	.....do.....	
1921	....do...	27 09 00	170 48 45	2,593	71	71	.....	br. m.....	.....do.....	
1922	....do...	27 03 00	170 49 00	2,265	71	70	.....	br. m.....	.....do.....	
1923	Jan. 13	27 07 00	170 45 15	2,598	72	70	.....	br. m.....	.....do.....	
1924	....do...	27 11 00	170 42 00	2,573	71	70	.....	br. m.....	.....do.....	
1925	....do...	26 49 20	170 41 15	2,607	72	71	.....	br. m.....	.....do.....	
1926	....do...	27 01 00	170 26 00	2,535	78	72	.....	br. m.....	.....do.....	
1927	....do...	26 43 20	170 21 00	2,597	79	72	.....	br. m.....	.....do.....	
1928	....do...	26 57 00	170 02 45	2,564	75	73	.....	br. m.....	.....do.....	
1929	....do...	26 39 00	169 54 45	2,500	72	73	.....	br. m.....	.....do.....	
1930	Jan. 14	26 54 30	169 36 00	2,460	71	72	.....	br. m.....	.....do.....	
1931	....do...	26 36 00	169 29 00	2,528	71	72	.....	br. m.....	.....do.....	
1932	....do...	26 52 00	169 10 00	2,458	72	72	.....	br. m.....	.....do.....	
1933	....do...	26 40 30	169 06 45	2,504	73	72	.....	br. m.....	.....do.....	
1934	....do...	26 43 00	168 55 45	2,499	74	73	.....	br. m.....	.....do.....	
1935	....do...	26 47 00	168 48 30	2,458	74	73	.....	br. m.....	.....do.....	
1936	....do...	26 36 30	168 46 45	2,501	72	73	.....	br. m.....	.....do.....	
1937	....do...	26 34 00	168 36 15	2,507	71	72	.....	br. m.....	.....do.....	
1938	....do...	26 40 30	168 27 45	2,434	73	72	.....	br. m.....	.....do.....	
1939	....do...	26 30 45	168 26 15	2,481	68	72	.....	.....	.....	No specimen.
1940	Jan. 15	26 36 30	168 17 30	2,499	64	71	.....	br. m.....	Red clay...	
1941	....do...	26 31 20	168 08 30	2,787	62	70	.....	br. m.....	.....do.....	
1942	Jan. 16	26 22 45	168 08 15	2,562	62	70	.....	br. m.....	.....do.....	
1943	....do...	26 17 00	167 58 15	2,466	62	70	.....	br. m.....	.....do.....	
1944	....do...	26 23 00	167 49 45	2,540	62	69	.....	br. m. bk. s.	.....do.....	
1945	....do...	26 13 45	167 48 30	2,529	62	70	.....	br. m.....	.....do.....	

Abstract of official record of soundings—Continued.

MIDWAY ISLANDS TO HAWAIIAN ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude west.	Depth.	Temperatures. Air.	Surface.	Bottom.	Character of bottom.	Deposit.	Remarks.
	1900.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
1946	Jan. 16	26 09 00	167 39 45	2,555	62	70	.....	br. m.....	Red clay...	
1947	....do...	26 14 20	167 29 45	2,550	62	70	.....	br. m.....	.....do.....	
1948	Jan. 17	26 05 30	167 29 30	2,620	62	69	.....	br. m.....	.....do.....	
1949	....do...	26 00 45	167 20 30	2,666	65	70	.....	br. m. bk. s..	.....do.....	
1950	....do...	26 05 45	167 10 30	2,694	71	71	.....	br. m.....	.....do.....	
1951	....do...	25 56 45	167 10 45	2,693	76	71	.....	br. m. br. and bk. s.	.....do.....	
1952	....do...	25 52 00	167 11 00	2,682	71	71	.....	G.....	.....do.....	Manganese.
1953	....do...	25 47 00	167 10 45	2,252	68	71	.....	br. m.....	.....do.....	
1954	....do...	25 50 00	167 06 30	2,719	66	71	.....	br. m. br. and bk. s.	.....do.....	
1955	....do...	25 52 45	167 02 00	2,706	67	71	.....	br. m.....	.....do.....	
1956	....do...	25 55 30	166 57 15	2,708	68	70	.....	br. m.....	.....do.....	
1957	....do...	25 46 00	167 00 45	2,728	66	70	.....	br. m.....	.....do.....	
1958	....do...	25 41 15	167 02 30	2,751	67	70	.....	gy. s. and m .	.....	No specimen.
1959	....do...	25 44 15	166 53 30	2,716	70	70	.....	br. m.....	.....	Do.
1960	Jan. 18	25 47 15	166 44 45	2,731	69	71	.....	br. m.....	Red clay...	
1961	....do...	25 37 20	166 43 45	2,788	71	72	.....	br. m.....	.....do.....	
1962	....do...	25 24 40	166 40 30	2,807	73	72	.....	br. m.....	.....do.....	
1963	....do...	25 35 45	166 27 15	2,702	69	71	.....	br. m.....	.....do.....	
1964	....do...	25 16 20	166 22 00	2,769	69	71	.....	br. m.....	.....do.....	
1965	....do...	25 30 45	166 06 15	2,748	69	71	.....	br. m.....	.....do.....	
1966	....do...	25 12 30	166 01 00	2,799	69	72	.....	br. m.....	.....do.....	
1967	Jan. 19	25 25 00	165 45 00	2,695	72	73	.....	br. m.....	.....do.....	
1968	....do...	25 06 20	165 40 45	2,782	76	73	.....	br. m.....	.....do.....	
1969	....do...	25 19 20	165 23 15	2,705	71	72	.....	br. m.....	.....do.....	
1970	....do...	24 59 30	165 20 45	2,758	70	71	.....	br. m.....	.....do.....	
1971	....do...	25 12 15	165 05 15	2,722	69	71	.....	br. m.....	.....do.....	
1972	....do...	24 53 20	165 02 30	2,760	70	72	.....	br. m.....	.....do.....	
1973	Jan. 20	25 06 15	164 46 00	2,745	74	73	.....	br. m.....	.....do.....	
1974	....do...	24 47 40	164 44 00	2,874	71	75	.....	br. m.....	.....do.....	
1975	....do...	25 00 00	164 28 00	2,744	70	74	.....	br. m.....	.....do.....	
1976	....do...	24 37 00	164 24 20	2,745	71	75	.....	br. m.....	.....do.....	
1977	....do...	24 50 40	164 12 30	2,721	70	74	.....	br. m.....	.....do.....	
1978	....do...	24 30 40	164 07 15	2,711	71	74	.....	br. m.....	.....do.....	
1979	Jan. 21	24 45 00	163 54 45	2,725	71	73	.....	br. m.....	.....do.....	
1980	....do...	24 27 00	163 49 15	2,725	70	73	.....	br. m.....	.....do.....	
1981	....do...	24 43 00	163 36 00	2,741	71	74	.....	br. m..	.....do.....	
1982	....do...	24 21 00	163 28 00	2,769	75	74	.....	br. m.....	.....do.....	
1983	..do...	24 35 00	163 13 45	2,741	72	74	.....	br. m.....	.....do.....	
1984	....do...	24 16 00	163 06 45	2,718	74	73	.....	br. m.....	.....do.....	
1985	Jan. 22	24 30 00	162 51 30	2,746	73	73	.....	br. m.....	.....do.....	
1986	....do...	24 10 40	162 46 45	2,705	73	74	.....	br. m.....	.....do.....	
1987	....do...	24 23 00	162 30 00	2,710	78	74	.....	br. m.....	.....do.....	
1988	....do...	24 05 30	162 28 15	2,638	77	74	.....	br. m.....	.....do.....	
1989	....do...	24 16 20	162 06 45	2,626	74	75	.....	br. m.....	.....do.....	
1990	....do...	23 58 00	162 04 15	2,473	71	74	.....	br. m...	.....do.....	
1991	....do...	24 10 00	161 43 45	2,545	70	74	.....	br. m.....	.....do.....	
1992	Jan. 23	23 50 30	161 40 00	2,432	70	74	.....	br. m.....	.....do.....	
1993	....do...	24 03 30	161 20 15	2,596	70	74	.....	br. m.....	.....do.....	
1994	....do...	23 43 00	161 16 15	2,492	73	75	.....	br. m.....	.....do.....	
1995	....do...	23 54 45	161 01 30	2,607	74	76	.....	br. m.....	.....do.....	
1996	....do...	23 35 00	161 00 30	2,605	75	75	.....	br. m.....	.....do.....	
1997	....do...	23 47 20	160 45 30	2,638	70	74	.....	br. m.....	.....do.....	
1998	....do...	23 27 30	160 45 00	2,656	71	74	.....	br. m.....	.....do.....	
1999	Jan. 24	23 40 30	160 28 45	2,638	69	74	.....	br. m.....	.....do.....	
2000	....do...	23 20 40	160 28 00	2,638	72	75	.....	br. m.....	.....do.....	
2001	....do...	23 33 30	160 09 15	2,645	76	75	.....	br. m.....	.....do.....	
2002	....do...	23 13 30	160 08 15	2,679	74	76	.....	br. m.....	.....do.....	
2003	....do...	23 21 15	159 49 45	2,712	70	75	.....	br. m.....	.....do.....	
2004	....do...	23 01 45	159 52 00	2,702	71	75	.....	br. m.....	.....do.....	
2005	Jan. 25	23 08 45	159 30 15	2,689	71	75	.....	br. m.....	.....do.....	
2006	....do...	22 50 20	159 34 30	2,411	70	74	.....	br. m.....	.....do.....	
2007	....do...	22 53 40	159 21 15	2,586	68	74	.....	br. m.....	.....do.....	
2008	....do...	22 57 20	159 09 30	2,659	69	74	.....	br. m.....	.....do.....	
2009	....do...	23 01 30	159 06 15	2,659	69	75	.....	br. m.....	.....	No specimen
2010	....do...	22 52 15	159 08 00	2,429	68	75	.....	br. m.....	Red clay...	
2011	....do...	22 48 00	159 07 00	2,468	69	75	.....	br. m.....	.....do.....	
2012	....do...	22 48 00	159 07 00	2,400	68	75	.....	br. m.....	.....do.....	
2013	....do...	22 48 00	159 00 15	2,535	69	74	.....	br. m.....	.....do.....	
2014	....do...	22 55 20	158 49 15	2,633	66	74	.....	br. m.....	.....do.....	
2015	Jan. 26	22 46 40	158 50 00	2,556	67	74	.....	br. m.....	.....do.....	
2016	....do...	22 42 40	158 41 00	2,670	66	75	.....	br. m.....	.....do.....	
2017	....do...	22 50 00	158 32 40	2,638	66	75	.....	br. m.....	.....do.....	

Abstract of the official record of soundings—Continued.

MIDWAY ISLANDS TO HAWAIIAN ISLANDS—Continued.

Station No.	Date.	Latitude north.	Longitude west.	Depth.	Temperatures.			Character of bottom.	Deposit.	Remarks.
					Air.	Surface.	Bottom.			
	1900.	° ′ ″	° ′ ″	*Fathoms.*	°	°	°			
2018	Jan. 26	22 42 00	158 34 00	2,658	66	75	.....	br. m.....	Red clay...	
2019	....do...	22 37 45	158 30 00	2,676	66	76	.....	br. m.....	.....do.....	
2020	....do...	22 34 00	158 32 15	2,726	67	76	.....	br. m.....	.....do.....	
2021	....do...	22 26 40	158 33 40	2,710	69	76	.....	br. m.....	.....do.....	
2022	....do...	22 33 30	158 47 00	2,329	69	76	.....	br. m.....	.....do.....	
2023	....do...	22 24 00	158 42 20	2,763	68	74	.....	br. m.....	.....do.....	
2024	....do...	22 21 00	158 39 00	2,570	67	74	.....	br. m.....	.....do.....	
2025	....do...	22 21 45	158 32 30	2,670	68	74	.....	br. m.....	.....do.....	
2026	Jan. 27	22 29 45	158 23 00	2,705	69	74	.....	br. m.....	.....do.....	
2027	....do...	22 22 00	158 25 30	2,715	69	74	.....	br. m.....	.....do.....	
2028	....do...	22 19 30	158 18 30	2,370	69	74	.....	br. m.....	.....do.....	
2029	....do...	22 11 00	158 17 30	2,518	70	74	.....	br. m.....	.....do.....	
2030	....do...	22 03 30	158 16 20	2,519	70	74	.....	br. m.....	.....do.....	
2031	....do...	21 54 30	158 11 45	1,624	72	74	.....	gy. m. and s.	Globigerina ooze.	
2032	....do...	21 48 20	158 10 45	1,014	71	76	.....	gy. m. and s.	.....do.....	
2033	....do...	21 43 45	158 09 00	249	70	76	.....	gy. m. and s.	.....do.....	
2034	....do...	21 41 45	158 08 40	175	70	76	.....	gy. m. and s.	.....do.....	
2035	....do...	21 40 42	158 07 27	114	.....	.....	.....	gy. m. and s.	.....do.....	
2036	....do...	21 40 32	158 07 20	82	.....	.....	.....	gy. m. and s.	Coral sand.	
2037	....do...	21 39 46	158 06 25	55	.....	.....	.....	gy. and bk. s.	.....do.....	
2038	....do...	21 39 20	158 05 55	34	.....	.....	.....	gy. and bk. s.	.....do.....	Long threads of volcanic glass. Waimea Bay.
2039	....do...	21 39 08	158 05 37	24	.....	.....	.....	gy. and br. s.	.....do.....	
2040	....do...	21 39 03	158 05 28	21	.....	.....	.....	gy. and br. s.	.....do.....	
2041	....do...	21 40 00	158 05 35	33	.....	.....	.....	gy. and br. s.	.....do.....	
2042	....do...	21 41 00	158 05 46	55	.....	.....	.....	gy. and br. s.	.....do.....	
2043	....do...	21 41 30	158 05 50	58	.....	.....	.....	gy. and br. s.	.....do.....	
2044	....do...	21 42 00	158 05 55	69	.....	.....	.....	.....	.....	No specimen.
2045	....do...	21 42 35	158 06 00	93	.....	.....	.....	gy. and br. s.	Coral sand.	
2046	....do...	21 42 45	158 06 02	119	.....	.....	.....	gy. s.....	.....do.....	
2047	....do...	21 45 45	158 06 30	217	69	76	.....	gy. and r. s..	.....do.....	
2048	....do...	21 52 45	158 07 20	1,483	70	76	.....	C.....	.....	A small manganese concretion.
2049	....do...	21 59 30	158 08 30	2,226	68	75	.....	br. m.....	Red clay...	
2050	....do...	22 07 00	158 10 00	2,555	70	75	.....	br. m.....	.....do.....	
2051	Jan. 28	22 13 00	158 26 30	2,616	70	75	.....	br. m.....	.....do.....	
2052	....do...	21 59 30	158 39 00	1,184	70	75	.....	gy. s.....	Globigerina ooze.	
2053	....do...	21 59 20	158 25 40	1,651	75	75	.....	gy. s.....	.....do.....	
2054	....do...	21 48 40	158 17 45	1,237	72	75	.....	gy. m. bk. G .	.....	No specimen.
2055	....do...	21 45 30	158 25 45	536	75	76	.....	gy. m. bk. s..	Globigerina ooze.	
2056	....do...	21 45 20	158 39 00	541	75	76	.....	br. s. G	.....do.....	Large manganese concretion.
2057	....do...	21 38 40	158 31 20	440	75	77	.....	br. and bk. s.	.....	No specimen.
2058	....do...	21 36 40	158 43 00	1,058	75	77	.....	gy. s.....	.....	Do.
2059	....do...	21 46 15	158 49 20	677	69	76	.....	gy. and bk. s.	Globigerina ooze.	
2060	....do...	21 21 30	158 35 00	1,416	70	75	.....	gy. m.....	.....do.....	
2061	....do...	21 10 00	158 21 20	1,670	69	75	.....	gy. m.....	.....do.....	
2062	....do...	21 15 45	158 14 30	952	70	74	.....	.....	.....	Do.
2063	....do...	21 03 30	158 01 30	437	69	74	.....	.....	Globigerina ooze.	Small specimen.
2064	....do...	21 00 20	158 02 00	1,355	69	74	.....	.....	.....do.....	
2065	Jan. 29	21 06 40	158 01 00	294	69	74	.....	gy. m.....	.....do.....	
2066	....do...	21 08 45	157 58 00	278	69	74	.....	gy. m.....	.....do.....	
2067	....do...	21 10 30	157 57 00	323	69	75	.....	gy. m. and s.	.....do.....	Manganese nodules.
2068	....do...	21 11 30	157 56 00	307	69	75	.....	gy. m. and s.	.....do.....	
2069	....do...	21 12 45	157 55 00	287	.....	.....	.....	gy. m. and s.	.....do.....	
2070	....do...	21 13 45	157 54 30	285	.....	.....	.....	gy. m. and s.	.....do.....	Pteropods.
2071	....do...	21 14 40	157 53 40	271	.....	.....	.....	gy. m. and s.	.....do.....	
2072	....do...	21 15 40	157 53 45	201	.....	.....	.....	C.....	Coral sand.	Fragments of coral.
2073	....do...	21 16 20	157 54 00	33	.....	.....	.....	C.....	.....do.....	
2074	....do...	21 16 40	157 53 20	22	.....	.....	.....	C.....	.....do.....	Honolulu.

EXPLANATION OF PLATES.

PLATE I.

Fig. 1. Station 385. 720 fathoms. Coarse Globigerina Ooze.
Orbulina universa d'Orbigny, *Globigerina conglobata* Brady, *Sphæroidina bulloides* d'Orbigny, *Candeina nitida* d'Orbigny, *Pulvinulina menardii* d'Orbigny, *P. tumida* Brady, *P. micheliana* d'Orbigny.
Magnified 15 diameters.

Fig. 2. Station 385. 720 fathoms. Fine Globigerina Ooze.
Mostly *Globigerina bulloides* d'Orbigny, with fragments of *Orbulina universa* d'Orbigny.
Magnified 15 diameters.

PLATE II.

Fig. 1. Station 645. 1,102 fathoms.
Silicous casts of foraminifera, after treatment with hydrochloric acid.
Magnified 15 diameters.

Fig. 2. Red Clay Sediment.
Manganese concretions, volcanic sand, crystals of phillipsite, tooth from the lingual ribbon of a mollusk.
Magnified 15 diameters.

PLATE III.

Fig. 1. Station 688. 1,346 fathoms.
Manganese-iron concretions.
Magnified 15 diameters.

Fig. 2. Station 338. 2,128 fathoms.
Stellate crystals and spherules of phillipsite.
Magnified 15 diameters.

PLATE IV.

Fig. 1. Station 670. 1,376 fathoms.
Dark brown, translucent glass, from volcanic mud.
Magnified 15 diameters.

Fig. 2. Station 995. 2,091 fathoms.
Filamentous, colorless volcanic glass.
Magnified 15 diameters.

PLATE V.

Fig. 1. Station 746. 2,788 fathoms. Diatom Ooze.
Coscinodiscus rex Wallich.
Magnified 15 diameters.

Fig. 2. Station 746. 2,788 fathoms. Diatom Ooze.
Segment of valve of *Coscinodiscus rex* Wallich.
Magnified 180 diameters.

Fig. 3. Station 746. 2,788 fathoms. Diatom Ooze.
Portion of band connecting the valves of *Coscinodiscus rex* Wallich.
Magnified 180 diameters.

PLATE VI.

Diagram of the survey.

PLATE VII.

Track chart, Hawaiian Islands to Midway Islands.

PLATE VIII.

Contour chart, Hawaiian Islands to Midway Islands.

PLATE IX.

Track chart, Midway Islands to Guam.

PLATE X.

Contour chart, Midway Islands to Guam.

PLATE XI.

Track chart, Guam to Luzon.

PLATE XII.

Contour chart, Guam to Luzon.

PLATE XIII.

Track chart, Guam to Yokohama.

PLATE XIV

Contour chart, Guam to Yokohama.

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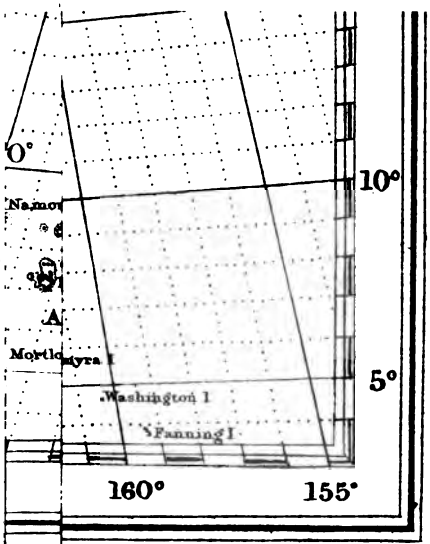
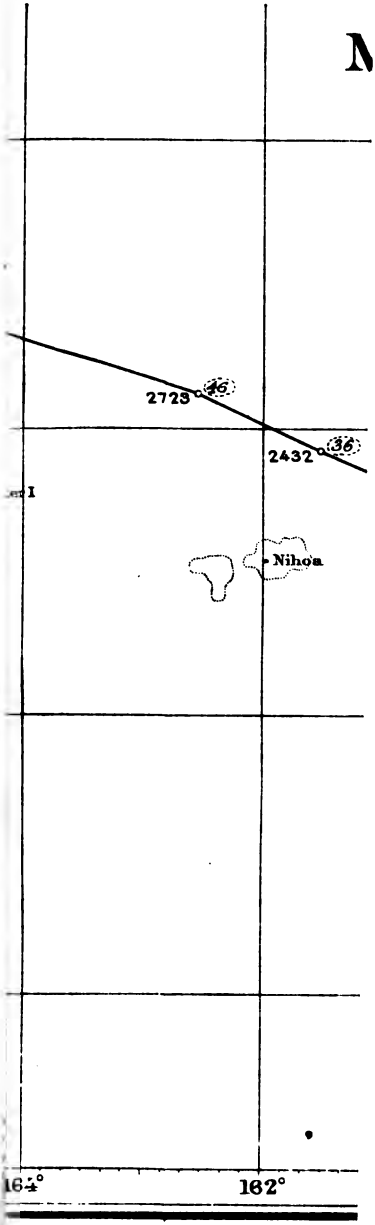
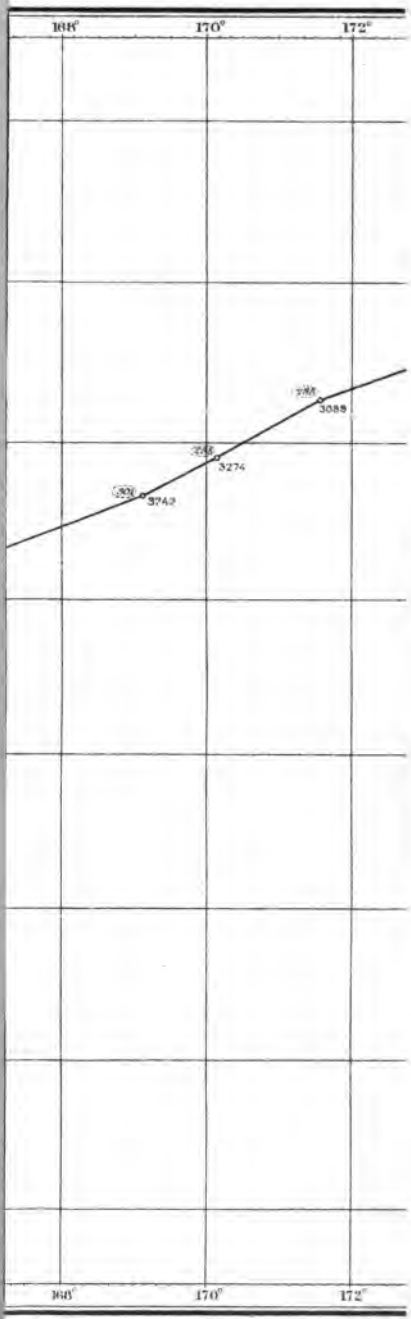
VOLCANIC GLASS.

FOR EXPLANATION OF PLATE SEE PAGE 61.







5, PL. X